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Charles Downing

FORTY-EIGHTH ANNUAL REPORT

OF THE

Indiana State Board of Agriculture

VOLUME XL—1898-99.

INCLUDING THE

*Proceedings of the Annual Meeting, 1899; Reports of County and District Societies,
State Meetings of Swine Breeders, Wool Growers, Poultry Association,
Farmers' Institutes, Experiment Station, Farmers' Insurance
Union, Statistics on Vegetables and Cereals,
and Table of Commercial Fertilizers.*

TO THE GOVERNOR.

INDIANAPOLIS:

WM. E. BURFORD, CONTRACTOR FOR STATE PRINTING AND BINDING.
1899.

THE STATE OF INDIANA,
EXECUTIVE DEPARTMENT,
September 1, 1899. }

Received by the Governor, examined and referred to the Auditor of State for verification of the financial statement.

OFFICE OF AUDITOR OF STATE,
INDIANAPOLIS, September 1, 1899. }

The within report, so far as the same relates to moneys drawn from the State Treasury, has been examined and found correct.

WILLIAM H. HART,
Auditor of State.

SEPTEMBER, 1, 1899.

Returned by the Auditor of State, with above certificate, and transmitted to Secretary of State for publication, upon the order of the Board of Commissioners of Public Printing and Binding.

CHARLES E. WILSON,
Private Secretary.

Filed in the office of the Secretary of State of the State of Indiana, September 1, 1899.

UNION B. HUNT,
Secretary of State.

Received the within report and delivered to the printer this 1st day of September, 1899.

THOS. J. CARTER,
Clerk Printing Bureau.

MEMBERS
OF THE
Indiana State Board of Agriculture
1898.

- 1st District—JOHN C. HAINES, Lake, Spencer County.
2d District—MASON J. NIBLACK, Vincennes, Knox County.
3d District—W. W. STEVENS, Salem, Washington County.
4th District—E. A. ROBISON, Rocklane, Johnson County.
5th District—H. L. NOWLIN, Guilford, Dearborn County.
6th District—KNOX PORTER, Hagerstown, Wayne County.
7th District—H. B. HOWLAND, Howlands, Marion County.
8th District—CHARLES DOWNING, Greenfield, Hancock County.
9th District—CLAUDE MATTHEWS, Clinton, Vermillion County.
10th District—JOHN L. DAVIS, Crawfordsville, Montgomery County.
11th District—M. S. CLAYPOOL, Muncie, Delaware County.
12th District—MORTIMER LEVERING, Lafayette, Tippecanoe County.
13th District—JOHN L. THOMPSON, Gas City, Grant County.
14th District—COTT BARNETT, Logansport, Cass County.
15th District—AARON JONES, South Bend, St. Joseph County.
16th District—JAS. E. McDONALD, Ligonier, Noble County.
-

OFFICERS FOR 1898.

CHARLES DOWNING, *President.*

W. W. STEVENS,
Vice-President.

JOHN L. THOMPSON,
General Superintendent.

CHAS. F. KENNEDY,
Secretary.

E. J. ROBISON,
Treasurer.

Executive Committee.

MESSRS. MATTHEWS, LEVERING, NIBLACK AND CLAYPOOL.

BOARD OF AGRICULTURE.

A TABLE SHOWING THE OFFICERS, PLACE AND PREMIUMS PAID OF EACH FAIR HELD BY THE STATE BOARD OF AGRICULTURE.

Year	PRESIDENT.	SECRETARY.	TREASURER.	GENERAL SUPERINTENDENT.	PLACE OF FAIR.	PREMIUMS PAID.
1852	Gov. Joseph A. Wright.....	John B. Dillon.....	Royal Mayhew.....	W. T. Dennis.....	Indianapolis.....	.....
1853	Gov. Joseph A. Wright.....	John B. Dillon.....	Royal Mayhew.....	W. T. Dennis.....	Lafayette.....	.....
1854	Gov. Joseph A. Wright.....	Wm. T. Dennis.....	Royal Mayhew.....	W. T. Dennis.....	Indianapolis.....	\$2,753 00
1855	Gov. Joseph Orr.....	John B. Dillon.....	S. A. Buell.....	Calvin Fletcher, Jr.....	Indianapolis.....	4,225 00
1856	Dr. A. C. Stevenson.....	Ignatius Brown.....	S. A. Buell.....	Calvin Fletcher, Jr.....	Indianapolis.....	4,127 00
1857	Dr. A. C. Stevenson.....	John B. Dillon.....	Thomas H. Sharp.....	Calvin Fletcher, Jr.....	Indianapolis.....	.....
1858	Dr. A. C. Stevenson.....	John B. Dillon.....	Thomas H. Sharp.....	James L. Bradley.....	New Albany.....	6,163 00
1859	George D. Wagner.....	Wm. T. Dennis.....	Thomas H. Sharp.....	James L. Bradley.....	Indianapolis.....	3,827 00
1860	George D. Wagner.....	Wm. T. Dennis.....	Thomas H. Sharp.....	James L. Bradley.....	No Fair.....	.....
1861	D. P. Holloway.....	Wm. T. Dennis.....	H. A. Fletcher.....	J. A. Grosvener.....	Indianapolis.....	3,994 00
1862	James D. Williams.....	W. H. Loomis.....	H. A. Fletcher.....	J. A. Grosvener.....	Indianapolis.....	.....
1863	A. D. Hamrick.....	W. H. Loomis.....	Fra. de King.....	W. H. Loomis.....	Indianapolis.....	4,121 00
1864	Searns Fisher.....	W. H. Loomis.....	Fra. de King.....	J. A. Grosvener.....	Indianapolis.....	4,078 00
1865	Searns Fisher.....	W. H. Loomis.....	Carlos Dickson.....	J. A. Grosvener.....	Fort Wayne.....	.....
1866	Searns Fisher.....	W. H. Loomis.....	Carlos Dickson.....	J. A. Grosvener.....	Indianapolis.....	6,331 00
1867	A. D. Hamrick.....	A. J. Holmes.....	Carlos Dickson.....	J. B. Sullivan.....	Indianapolis.....	7,067 00
1868	A. D. Hamrick.....	A. J. Holmes.....	Carlos Dickson.....	J. B. Sullivan.....	Indianapolis.....	7,517 00
1869	A. D. Hamrick.....	A. J. Holmes.....	Carlos Dickson.....	J. B. Sullivan.....	Indianapolis.....	7,914 00
1870	J. D. Williams.....	Joseph Poole.....	Carlos Dickson.....	J. S. Benson.....	Indianapolis.....	8,544 00
1871	J. D. Williams.....	Joseph Poole.....	Carlos Dickson.....	J. S. Benson.....	Indianapolis.....	8,544 00
1872	John Sutherland.....	Alex. Herron.....	Carlos Dickson.....	J. A. Grosvener.....	Indianapolis.....	9,619 20
1873	John Sutherland.....	Alex. Herron.....	Carlos Dickson.....	H. W. Caldwell.....	Indianapolis.....	8,964 75
1874	John Sutherland.....	Alex. Herron.....	Carlos Dickson.....	H. W. Caldwell.....	Indianapolis.....	10,751 00
1875	William Crim.....	Alex. Herron.....	Carlos Dickson.....	E. J. Howland.....	Indianapolis.....	12,068 20
1876	Hezekiah Caldwell.....	Alex. Herron.....	Carlos Dickson.....	F. J. Hanna.....	Indianapolis.....	8,179 30
1877	Jacob Mutz.....	Alex. Herron.....	Carlos Dickson.....	J. W. Furnas.....	Indianapolis.....	6,337 98
1878	W. B. Seward.....	Alex. Herron.....	Carlos Dickson.....	R. M. Lockhart.....	Indianapolis.....	5,057 00
1879	Robert Mitchell.....	Alex. Herron.....	Carlos Dickson.....	R. M. Lockhart.....	Indianapolis.....	5,472 00
1880	W. H. Kagan.....	Alex. Herron.....	Carlos Dickson.....	Fielding Beeler.....	Indianapolis.....	6,553 00
1881	R. M. Lockhart.....	Alex. Herron.....	J. A. Wildman.....	Fielding Beeler.....	Indianapolis.....	6,855 50
1882	H. C. Meredith.....	Alex. Herron.....	J. A. Wildman.....	Fielding Beeler.....	Indianapolis.....	8,086 00
1883	Robert Mitchell.....	Alex. Herron.....	J. A. Wildman.....	Fielding Beeler.....	Indianapolis.....	9,581 13
1884	Robert Mitchell.....	Alex. Herron.....	J. A. Wildman.....	Fielding Beeler.....	Indianapolis.....	10,414 30
1885	R. M. Lockhart.....	Alex. Herron.....	S. Johnson.....	Fielding Beeler.....	Indianapolis.....	9,000 50
1886	W. B. Seward.....	Alex. Herron.....	S. Johnson.....	H. B. Stout.....	Indianapolis.....	9,419 00
1887	W. B. Seward.....	Alex. Herron.....	S. Johnson.....	H. B. Stout.....	Indianapolis.....	9,724 50
1888	J. N. Davidson.....	Alex. Herron.....	S. Johnson.....	Chas. B. Merrifield.....	Indianapolis.....	9,917 50
1889	J. N. Davidson.....	Alex. Herron.....	S. Johnson.....	R. M. Lockhart.....	Indianapolis.....	10,200 00
1890	W. A. Banks.....	Alex. Herron.....	S. Johnson.....	C. E. Merrifield.....	Indianapolis.....	13,040 50
1891	W. A. Banks.....	Leon T. Bagley.....	S. Johnson.....	C. E. Merrifield.....	Indianapolis.....	15,297 00

1892	J. M. Rogers.....	Leon T. Bagley.....	S. Johnson.....	E. H. Peed.....	Indianapolis.....	\$19,576 00
1893	V. K. Officer.....	Chas. F. Kennedy.....	Jas. A. Wildman.....	E. H. Peed.....	Indianapolis.....	18,407 50
1894	J. W. Sankey.....	Chas. F. Kennedy.....	E. J. Robison.....	E. H. Peed.....	Indianapolis.....	18,516 70
1895	J. M. Sankey.....	Chas. F. Kennedy.....	E. J. Robison.....	E. H. Peed.....	Indianapolis.....	17,561 98
1896	W. W. Hamilton.....	Chas. F. Kennedy.....	E. J. Robison.....	E. H. Peed.....	Indianapolis.....	14,817 17
1897	C. B. Harris.....	Chas. F. Kennedy.....	E. J. Robison.....	E. H. Peed.....	Indianapolis.....	19,236 88
1898	Charles Downing.....	Chas. F. Kennedy.....	E. J. Robison.....	John L. Thompson.....	Indianapolis.....	11,113 32
1899	W. W. Stevens.....	Chas. F. Kennedy.....	J. W. Lagrange.....	H. B. Howland.....	Indianapolis.....	.....

* Henry C. Meredith died July 5, 1882, and the Vice-President, L. B. Custer, served the unexpired term.

LIST OF MEMBERS OF INDIANA STATE BOARD OF AGRICULTURE
SHOWING DATE AND TERM OF SERVICE.

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED
Allen, Joseph	Montgomery	1853	2
Banks, W. A	Laporte	1882	12
Barnes, John P	Madison	1879	4
Barnett, Cott	Cass	1898	1
Basler, F.	Sullivan	1872	2
Bennett, Wm. H	Union	1854	7
Bennett, Wm. H	Union	1863	2
Berry, W. W	Knox	1889	3
Blackstock, Wm. M.	Tippecanoe	1895	2
Blanche, Willis	Howard	1887	2
Boggs, John M	Tippecanoe	1885	8
Bonner, W. H . . . . .	. . . . .	1859	2
Bradley, James L.	Johnson	1856	3
Branham, D. C	Jefferson	1861	2
Brown, Dr. R. T.	Montgomery	1855	4
Brown, Geo. W.	Shelby	1857	2
Burke, L. A	Posey	1870	5
Buskirk, Geo. A	Monroe	1870	2
Caldwell, Hezekiah	Wabash	1867	12
Carr, John F	Jackson	1862	2
Claypool, A. B.	Fayette	1871	8
Claypool, M. S.	Delaware	1893	6
Clemens, B. F	Wabash	1889	2
Cockrum, Jas. W	Gibson	1853	2
Coffin, W. G	Vermillion	1859	4
Cofield, J. W	Ohio	1877	4
Collins, T. H	Floyd	1858	4
Cotteral, W. W	Henry	1883	2
Cox, E. T	Posey	1864	6
Crawford, George	Laporte	1862	2
Crim, Wm	Madison	1869	9
Custer, L. B	Cass	1878	10
Davis, John L	Montgomery	1895	4
Davidson, Stephen	Fulton	1870	8
Davidson, Jasper N	Montgomery	1883	12
Dennis, W. T	Wayne	1854	5
Donaldson, W. C	Parke	1863	8
Dowling, Thos	Vigo	1871	4
Downing, Charles	Hancock	1893	6
Drake, James P	Marion	1854	2
Dume, George G	Lawrence	1851	2
Duncan, Wm	Lawrence	1858	4
Dungan, S. W	Johnson	1882	12
Durham, Thos	Vigo	1852	2

LIST OF MEMBERS, ETC.—Continued.

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED.
Emison, Samuel	Knox	1851	2
Fisher, Starnes	Wabash	1854	13
Fletcher, Calvin	Marion	1862	2
Franklin, W. M	Owen	1855	3
Freeman, A	Porter	1858	4
Gaar, J. M	Wayne	1865	2
Gerard, J. B	Dearborn	1873	2
Gilbert, Joseph	Vigo	1881	2
Graffe, Dr. G. B	Gibson	1855	5
Graham, John M	Delaware	1883	4
Greer, W. A	Dearborn	1885	3
Grosvenor, J. A	Marion	1864	2
Haines, John C.	Lake	1896	3
Hamrick, A. D	Putnam	1859	14
Hamilton, W. W	Decatur	1891	6
Hancock, R. H	Harrison	1878	6
Hargrove, Samuel	Pike	1882	6
Harris, Chas. B	Elkhart	1892	6
Harris, Jacob R	Switzerland	1851	4
Hay, A. Y	Clarke	1854	2
Haymond, Dr. Rufus	Franklin	1855	4
Haynes, R. P	Davies	1875	8
Helm, Dr. Y. C	Delaware	1859	10
Herriot, Samuel	Johnson	1853	2
Herron, Alex	Fayette	1867	4
Holton, W. B	Marion	1894	2
Holloway, David P	Wayne	1851	4
Holloway, David P	Wayne	1861	2
Holmes, D. J. C	Delaware	1859	10
Howland, H. B	Marion	1892	2
Howland, H. B	Marion	1896	3
Huffstetter, David	Orange	1853	2
Hussey, George	Vigo	1851	1
Johnson, F. C	Floyd	1872	6
Jones, Aaron	St. Joseph	1894	5
Jones, Dick	Bartholomew	1883	8
Jones, Lloyd	Huntington	1889	4
Kelley, John B	Warrick	1851	2
Kirkpatrick, T. M	Howard	1881	2
Lagrange, J. W.	Johnson	1894	4
Lane, George W	Dearborn	1852	8
LaTourrette, Henry	Fountain	1883	4
Levering, John	Tippecanoe	1852	2
Levering, Mortimer	Tippecanoe	1897	2

LIST OF MEMBERS, ETC.—Continued.

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED.
Lockhart, R. M.	DeKalb	1874	20
Loder, Isaac B.	Rush	1861	4
Loomis, W. H.	Allen	1861	4
Matson, J. A.	Putnam	1854	1
Mathews, Claude.	Vermillion	1897	2
Maze, W. A.	Tipton	1891	4
Meredith, Henry C.	Wayne	1879	4
Milbouse, J. V.	Jennings	1875	2
Mitchell, Robert	Gibson	1875	21
Mitchell, Thos. V.	Rush	1869	10
Morgan, Jessie	Rush	1852	2
Mutz, Jacob	Shelby	1868	14
McBride, Jeremiah	Martin	1851	3
McClung, J. A.	Fulton	1888	4
McConnell, George N.	Steuben	1860	2
McConnell, George N.	Steuben	1864	6
McCoy, James S.	Knox	1892	4
McCrea, John	Monroe	1864	6
McDonald, M. A.	Warren	1893	2
McDonald, James E.	Noble	1894	5
McMahan, John	Washington	1851	3
McWilliams, R. C.	Parke	1881	2
Nelson, J. D. G.	Allen	1853	6
Nelson, J. D. G.	Allen	1870	4
Nelson, Thomas	Parke	1875	4
Nelson, Thomas	Parke	1889	2
Niblack, Mason J.	Knox	1896	3
North, Benjamin	Ohio	1867	6
Nowlin, H. L.	Dearborn	1897	2
Officer, V. K.	Jefferson	1888	9
O'Neal, J. K.	Tippecanoe	1881	2
Orr, Joseph.	Laporte	1851	6
Peck, Henry	Cass	1862	2
Peed, E. H.	Henry	1885	8
Piatt, Nathan	Warrick	1860	4
Porter, Knode	Wayne	1897	2
Poole, Joseph	Fountain	1861	12
Quick, S. R.	Bartholomew	1879	4
Raab, D. G.	Ohio	1856	5
Ragan, W. H.	Putnam	1873	10
Ratliff, John	Grant	1883	4
Reese, D. E.	Dearborn	1865	4
Reiter, Gerard	Knox	1888	1
Robison, E. A.	Johnson	1898	1

LIST OF MEMBERS, ETC.—Continued.

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED.
Sample, H. P.	Tippecanoe	1873	8
Sankey, James M	Vigo	1891	6
Shemmer, John C.	Perry	1862	10
Seig, J. Q. A	Harrison	1884	10
Seward A.	Monroe	1851	2
Seward, W. B	Monroe	1872	20
Seybold, Dempsey	Parke	1879	2
Simonton Robert	Huntington	1887	2
Smith, Abraham	Knox	1853	2
Spalding, T. N	Lagrange	1852	2
Stevenson, Alex C	Putnam	1851	3
Stevenson, Alex. C	Putnam	1855	4
Stevens W. W	Washington	1894	5
Stewart, Charles B	Tippecanoe	1883	2
Sunman, T. W W	Ripley	1881	4
Sutherland John	Laporte	1864	18
Swinney, Thomas W	Allen	1851	1
Thompson, John L	Grant	1895	4
Thompson S. H	Jefferson	1844	3
Turner, John N	Grant	1879	2
Tuttle, T. W	Delaware	1876	1
Vawter, S	Jennings	1855	3
Vinton, A. E.	Marion	1858	2
Wagner, G. D	Warren	1854	7
Wiley, Lemuel	Switzerland	1863	1
Wilard, Roland	Kosciusko	1851	2
Williams, James D	Knox	1855	18
Wright Joseph A.	Marion	1851	3

State Industrial Associations.

OFFICERS FOR 1899.

Indiana State Board of Agriculture—W. W. Stevens, Salem; Secretary, Chas. F. Kennedy, Indianapolis.

Indiana Horticultural Association—President, C. M. Hobbs, Bridgeport; Secretary, James Troop, Lafayette.

Indiana Shorthorn Breeders' Association—President, E. Felsom, Indianapolis; Secretary, W. J. Quick, Brooklyn.

Indiana Dairymen's Association—President, J. J. W. Billingsly, Indianapolis; Secretary, H. E. Van Norman, Lafayette.

Indiana Wool-Growers' Association—President, Sid. Conger, Flatrock; Secretary, J. W. Robe, Greencastle.

Indiana Swine Breeders' Association—President, J. B. Luyster, Franklin; Secretary, Allen Beeler, Liberty.

Indiana Poultry Breeders' Association—President, Frank Johnson, Howland; Secretary, Jesse Tarkington, Indianapolis.

Indiana Farmers' Mutual Insurance Union—President, Aaron Jones, South Bend; Secretary, Joshua Strange, Marion.

Indiana Jersey Cattle Club—President, Dr. G. V. Woollen, Indianapolis; Secretary, W. S. Budd, Malot Park.

Farmers' Institutes—Director, Prof. W. C. Latta, Purdue University, Lafayette.

Experiment Station—Director, Prof. C. S. Plumb, Purdue University, Lafayette.

State Chemist—Prof. H. A. Huston, Purdue University, Lafayette.

State Entomologist—Prof. James Troop, Purdue University, Lafayette.

THE Indiana State Board of Agriculture.

CONSTITUTION

AS REVISED AND ADOPTED AT THE JANUARY MEETING OF THE BOARD, 1891.

ARTICLE 1. The name and style of this society shall be "The Indiana State Board of Agriculture," its objects, to promote and improve the condition of agriculture, horticulture, and the mechanic, manufacturing and household arts.

ART. 2. There shall be held in the city of Indianapolis, at such time as may be prescribed by law, an annual meeting of the State Board of Agriculture, together with presidents, or other delegates duly authorized, from each county, or such other agricultural society as may be authorized by law to send delegates, who shall, for the time being, be ex-officio members of the State Board of Agriculture, for the purpose of deliberation and consultation as to the wants, prospects and condition of the agricultural interests throughout the State; and at such annual meetings the several reports from county societies shall be delivered to the President of the State Board of Agriculture; and the said President and delegates shall, at this meeting, elect suitable persons to fill all vacancies in this Board: Provided, however, That said election shall not affect the members of the Board present, whose terms shall not be considered to expire until the last day of the session.

ART. 3. The State Board-elect shall meet immediately after the adjournment of the State Board, for the purpose of organization and for the transaction of such other business as the wants and interests of the society may require; and hold such other meetings from time to time, for making out premium lists, preparing for State Fairs, and all other business necessary to the promotion of the objects of the society.

BOARD OF AGRICULTURE.

A TABLE SHOWING THE OFFICERS, PLACE AND PREMIUMS PAID OF EACH FAIR HELD BY THE STATE BOARD OF AGRICULTURE.

Year.	PRESIDENT.	SECRETARY.	TREASURER.	GENERAL SUPERINTENDENT.	PLACE OF FAIR.	PREMIUMS PAID.
1852	Gov. Joseph A. Wright.....	John B. Dillon.....	Royal Mayhew.....	W. T. Dennis.....	Indianapolis.....	.....
1853	Gov. Joseph A. Wright.....	John B. Dillon.....	Royal Mayhew.....	W. T. Dennis.....	Lafayette.....	.....
1854	Gov. Joseph A. Wright.....	Wm. T. Dennis.....	Royal Mayhew.....	W. T. Dennis.....	Madison.....	\$2,753 00
1855	Gen. Joseph Orr.....	John B. Dillon.....	S. A. Buell.....	Calvin Fletcher, Jr.....	Indianapolis.....	4,225 00
1856	Dr. A. C. Stevenson.....	Ignatius Brown.....	S. A. Buell.....	Calvin Fletcher, Jr.....	Indianapolis.....	4,127 00
1857	Dr. A. C. Stevenson.....	John B. Dillon.....	Thomas H. Sharp.....	Calvin Fletcher, Jr.....	Indianapolis.....	.....
1858	Dr. A. C. Stevenson.....	John B. Dillon.....	Thomas H. Sharp.....	Calvin Fletcher, Jr.....	Indianapolis.....	6,163 00
1859	George D. Wagner.....	Wm. T. Dennis.....	Thomas H. Sharp.....	James L. Bradley.....	New Albany.....	3,827 00
1860	D. P. Holloway.....	Wm. T. Dennis.....	Thomas H. Sharp.....	James L. Bradley.....	Indianapolis.....	.....
1861	James D. Williams.....	W. H. Loomis.....	H. A. Fletcher.....	J. A. Grosvenor.....	No Fair.....	3,994 00
1862	A. D. Hamrick.....	W. H. Loomis.....	H. A. Fletcher.....	J. A. Grosvenor.....	Indianapolis.....	.....
1863	A. D. Hamrick.....	W. H. Loomis.....	H. A. Fletcher.....	J. A. Grosvenor.....	Indianapolis.....	4,121 00
1864	Stearns Fisher.....	W. H. Loomis.....	Frank King.....	W. H. Loomis.....	Indianapolis.....	4,078 00
1865	Stearns Fisher.....	W. H. Loomis.....	Frank King.....	J. A. Grosvenor.....	Fort Wayne.....	.....
1866	Stearns Fisher.....	W. H. Loomis.....	Frank King.....	J. A. Grosvenor.....	Indianapolis.....	.....
1867	A. D. Hamrick.....	A. J. Holmes.....	Carlos Dickson.....	J. B. Sullivan.....	Terre Haute.....	6,331 00
1868	A. D. Hamrick.....	A. J. Holmes.....	Carlos Dickson.....	J. B. Sullivan.....	Indianapolis.....	7,087 00
1869	A. D. Hamrick.....	A. J. Holmes.....	Carlos Dickson.....	J. B. Sullivan.....	Indianapolis.....	7,517 00
1870	A. D. Hamrick.....	A. J. Holmes.....	Carlos Dickson.....	J. B. Sullivan.....	Indianapolis.....	7,914 00
1871	J. D. Williams.....	Joseph Poole.....	Carlos Dickson.....	J. S. Benson.....	Indianapolis.....	8,564 00
1872	John Sutherland.....	Alex. Herron.....	Carlos Dickson.....	H. W. Caldwell.....	Indianapolis.....	9,619 20
1873	John Sutherland.....	Alex. Herron.....	Carlos Dickson.....	H. W. Caldwell.....	Indianapolis.....	8,894 75
1874	John Sutherland.....	Alex. Herron.....	Carlos Dickson.....	E. J. Howland.....	Indianapolis.....	10,751 00
1875	William Crim.....	Alex. Herron.....	Carlos Dickson.....	E. J. Howland.....	Indianapolis.....	12,068 20
1876	Hezekiah Caldwell.....	Alex. Herron.....	Carlos Dickson.....	J. L. Hanna.....	Indianapolis.....	8,179 30
1877	W. B. Seward.....	Alex. Herron.....	Carlos Dickson.....	J. W. Furnas.....	Indianapolis.....	6,357 96
1878	W. B. Seward.....	Alex. Herron.....	Carlos Dickson.....	R. M. Lockhart.....	Indianapolis.....	5,957 00
1879	Robert Mitchell.....	Alex. Herron.....	Carlos Dickson.....	R. M. Lockhart.....	Indianapolis.....	5,478 00
1880	W. H. Ragan.....	Alex. Herron.....	Carlos Dickson.....	Fielding Beeler.....	Indianapolis.....	6,553 00
1881	R. M. Lockhart.....	Alex. Herron.....	J. A. Wildman.....	Fielding Beeler.....	Indianapolis.....	6,555 50
1882	H. C. Meredith.....	Alex. Herron.....	J. A. Wildman.....	Fielding Beeler.....	Indianapolis.....	8,096 00
1883	Robert Mitchell.....	Alex. Herron.....	J. A. Wildman.....	Fielding Beeler.....	Indianapolis.....	9,581 13
1884	R. M. Lockhart.....	Alex. Herron.....	S. Johnson.....	Fielding Beeler.....	Indianapolis.....	10,414 80
1885	R. M. Lockhart.....	Alex. Herron.....	S. Johnson.....	Fielding Beeler.....	Indianapolis.....	9,000 50
1886	W. B. Seward.....	Alex. Herron.....	S. Johnson.....	H. B. Stout.....	Indianapolis.....	9,419 00
1887	W. B. Seward.....	Alex. Herron.....	S. Johnson.....	Chas. B. Merrifield.....	Indianapolis.....	9,728 50
1888	J. N. Davidson.....	Alex. Herron.....	S. Johnson.....	R. M. Lockhart.....	Indianapolis.....	9,917 50
1889	J. N. Davidson.....	Alex. Herron.....	S. Johnson.....	C. E. Verrill.....	Indianapolis.....	10,200 00
1890	W. A. Banks.....	Alex. Herron.....	S. Johnson.....	C. E. Verrill.....	Indianapolis.....	13,040 50
1891	W. A. Banks.....	Leon T. Bagley.....	S. Johnson.....	C. E. Merrifield.....	Indianapolis.....	15,297 00

1892	J. M. Egges.....	Leon T. Bagley.....	S. Johnson.....	E. H. Peed.....	Indianapolis.....	\$19,876 00
1893	V. K. Officer.....	Chas. F. Kennedy.....	Jas. A. Wildman.....	E. H. Peed.....	Indianapolis.....	18,407 50
1894	J. M. Sankey.....	Chas. F. Kennedy.....	E. J. Robison.....	E. H. Peed.....	Indianapolis.....	18,516 70
1895	J. M. Sankey.....	Chas. F. Kennedy.....	E. J. Robison.....	E. H. Peed.....	Indianapolis.....	17,581 98
1896	W. W. Hamilton.....	Chas. F. Kennedy.....	E. J. Robison.....	E. H. Peed.....	Indianapolis.....	14,817 17
1897	C. B. Harris.....	Chas. F. Kennedy.....	E. J. Robison.....	E. H. Peed.....	Indianapolis.....	19,296 88
1898	Charles Downing.....	Chas. F. Kennedy.....	E. J. Robison.....	John L. Thompson.....	Indianapolis.....	11,113 32
1899	W. W. Stevens.....	Chas. F. Kennedy.....	J. W. Lagrange.....	H. B. Howland.....	Indianapolis.....	.....

• Henry C. Meredith died July 5, 1892, and the Vice-President, L. B. Custer, served the unexpired term.

LIST OF MEMBERS OF INDIANA STATE BOARD OF AGRICULTURE
SHOWING DATE AND TERM OF SERVICE.

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED
Allen, Joseph	Montgomery	1853	2
Banks, W. A	Laporte	1882	12
Barnes, John P	Madison	1879	4
Barnett, Cott.	Cass	1898	1
Basler, F.	Sullivan	1872	2
Bennett, Wm. H	Union	1854	7
Bennett, Wm. H	Union	1863	2
Berry, W. W	Knox	1889	3
Blackstock, Wm. M.	Tippecanoe	1895	2
Blanche, Willis	Howard	1887	2
Boggs, John M	Tippecanoe	1885	8
Bonner, W. H . . . . .	. . . . .	1859	2
Bradley, James L.	Johnson	1856	3
Branham, D. C	Jefferson	1861	2
Brown, Dr. R. T.	Montgomery	1855	4
Brown, Geo. W.	Shelby	1857	2
Burke, L. A	Posey	1870	5
Buskirk, Geo. A	Monroe	1870	2
Caldwell, Hezekiah	Wabash	1867	12
Carr, John F	Jackson	1862	2
Claypool, A. B	Fayette	1871	8
Claypool, M. S	Delaware	1893	6
Clemens, B. F	Wabash	1889	2
Cockrum, Jas. W	Gibson	1853	2
Coffin, W. G	Vermillion	1859	4
Coffield, J. W	Ohio	1877	4
Collins, T. H	Floyd	1858	4
Cotteral, W. W	Henry	1883	2
Cox, E. T	Posey	1864	6
Crawford, George	Laporte	1862	2
Crim, Wm	Madison	1869	9
Custer, L. B	Cass	1878	10
Davis, John L	Montgomery	1895	4
Davidson, Stephen	Fulton	1870	8
Davidson, Jasper N	Montgomery	1883	12
Dennis, W. T	Wayne	1854	5
Donaldson, W. C	Parke	1863	8
Dowling, Thos	Vigo	1871	4
Downing, Charles	Hancock	1893	6
Drake, James P	Marion	1854	2
Dume, George G	Lawrence	1851	2
Duncan, Wm	Lawrence	1858	4
Dungan, S. W	Johnson	1882	12
Durham, Thos	Vigo	1852	2

LIST OF MEMBERS, ETC.—Continued.

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED.
Emison, Samuel	Knox	1851	2
Fiaber, Starnes	Wabash	1854	13
Fletcher, Calvin	Marion	1862	2
Franklin, W. M	Owen	1855	3
Freeman, A	Porter	1858	4
Gaar, J. M	Wayne	1865	2
Gerard, J. B	Dearborn	1873	2
Gilbert, Joseph	Vigo	1881	2
Graffe, Dr. G. B	Gibson	1855	5
Graham, John M	Delaware	1883	4
Greer, W. A	Dearborn	1885	3
Grosvenor, J. A	Marion	1864	2
Haines, John C.	Lake	1896	3
Hamrick, A. D	Putnam	1859	14
Hamilton, W. W	Decatur	1891	6
Hancock, R. H	Harrison	1878	6
Hargrove, Samuel	Pike	1882	6
Harris, Chas. B	Elkhart	1892	6
Harris, Jacob R	Switzerland	1851	4
Hay, A. Y	Clarke	1854	2
Haymond, Dr. Rufus	Franklin	1855	4
Haynes, R. P	Davies	1875	8
Helm, Dr. Y. C	Delaware	1859	10
Herriot, Samuel	Johnson	1853	2
Herron, Alex	Fayette	1867	4
Holton, W. B	Marion	1894	2
Holloway, David P	Wayne	1851	4
Holloway, David P	Wayne	1861	2
Holmes, D. J. C	Delaware	1859	10
Howland, H. B	Marion	1892	2
Howland, H. B	Marion	1896	3
Huffstetter, David	Orange	1853	2
Hussey, George	Vigo	1851	1
Johnson, F. C	Floyd	1872	6
Jones, Aaron	St. Joseph	1894	5
Jones, Dick	Bartholomew	1883	8
Jones, Lloyd	Huntington	1889	4
Kelley, John B	Warrick	1851	2
Kirkpatrick, T. M	Howard	1881	2
Lagrange, J. W.	Johnson	1894	4
Lane, George W	Dearborn	1852	8
LaTourette, Henry	Fountain	1883	4
Levering, John	Tippecanoe	1852	2
Levering, Mortimer	Tippecanoe	1897	2

LIST OF MEMBERS, ETC.—Continued.

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED.
Lockhart, R. M.	Dekalb	1874.	20
Loder, Isaac B.	Rush	1861	4
Loomis, W. H.	Allen	1861	4
Matson, J. A.	Putnam	1854	1
Matthews, Claude.	Vermillion	1897	2
Maze, W. A.	Tipton	1891	4
Meredith, Henry C.	Wayne	1879	4
Milhouse, J. V.	Jennings	1875	2
Mitchell, Robert	Gibson	1875	21
Mitchell, Thos. V.	Rush	1869	10
Morgan, Jessie	Rush	1852	2
Mutz, Jacob	Shelby	1868	14
McBride, Jeremiah	Martin	1851	3
McClung, J. A.	Fulton	1888	4
McConnell, George N.	Steuben	1860	2
McConnell, George N.	Steuben	1864	6
McCoy, James S.	Knox	1892	4
McCrea, John	Monroe	1864	6
McDonald, M. A.	Warren	1893	2
McDonald, James E.	Noble	1894	5
McMahan, John	Washington	1851	3
McWilliams, R. C.	Parke	1881	2
Nelson, J. D. G.	Allen	1853	6
Nelson, J. D. G.	Allen	1870	4
Nelson, Thomas	Parke	1875	4
Nelson, Thomas	Parke	1889	2
Niblack, Mason J.	Knox	1896	3
North, Benjamin	Ohio	1867	6
Nowlin, H. L.	Dearborn	1897	2
Officer, V. K.	Jefferson	1888	9
O'Neal, J. K.	Tippecanoe	1881	2
Orr, Joseph.	Laporte	1851	6
Peck, Henry	Cass	1862	2
Peed, E. H.	Henry	1885	8
Piatt, Nathan	Warrick	1860	4
Porter, Knode	Wayne	1897	2
Poole, Joseph	Fountain	1861	12
Quick, S. R.	Bartholomew	1879	4
Raab, D. G.	Ohio	1856	5
Ragan, W. H.	Putnam	1873	10
Ratliff, John	Grant	1883	4
Reese, D. E.	Dearborn	1865	4
Reiter, Gerard	Knox	1888	1
Robison, E. A.	Johnson	1898	1

LIST OF MEMBERS, ETC.—Continued.

NAME.	COUNTY.	FIRST ELECTED.	NO. YEARS SERVED.
Sample, H. P.	Tippecanoe	1873	8
Sankey, James M	Vigo	1891	6
Shemaker, John C.	Perry	1862	10
Seig, J. Q. A	Harrison	1884	10
Seward A.	Monroe	1851	2
Seward, W. B	Monroe	1872	20
Seybold, Dempsey	Parke	1879	2
Simonton Robert	Huntington	1887	2
Smith, Abraham	Knox	1853	2
Spalding, T. N	Lagrange	1852	2
Stevenson, Alex C	Putnam	1851	3
Stevenson, Alex. C	Putnam	1855	4
Stevens, W. W	Washington	1894	5
Stewart, Charles B	Tippecanoe	1883	2
Sunman, T. W W	Ripley	1881	4
Sutherland John	Laporte	1864	18
Swinney, Thomas W	Allen	1851	1
Thompson, John L	Grant	1895	4
Thompson S. H	Jefferson	1844	3
Turner, John N	Grant	1879	2
Tuttle, T. W	Delaware	1876	1
Vawter, S	Jennings	1855	3
Vinton, A. E.	Marion	1858	2
Wagner, G. D	Warren	1854	7
Wiley, Lemuel	Switzerland	1863	1
Wilbard, Roland	Kosciusko	1851	2
Williams, James D	Knox	1855	18
Wright, Joseph A.	Marion	1851	3

MEETINGS OF INDIANA STATE BOARD OF AGRICULTURE.

JANUARY 5, 1898.

Immediately upon completing the organization the newly-elected President, Mr. Downing, assumed the Chair, and, with all members present, the Board transacted business as follows:

The motion of Mr. Levering that the President appoint a committee to confer with the Indiana Horticultural Society, relative to platting and planting a portion of the Fair Grounds so as to represent advanced horticulture, prevailed.

Committee—Mortimer Levering and E. A. Robison.

A committee representing the Board of Trade of the city of Indianapolis, composed of H. E. Kinney, C. S. Denny and Jno. S. Lazarus, requested that in fixing the date for the Fair for 1898, the Board will not select the date of the National K. of P. Encampment, which is to be held in the city of Indianapolis.

The motion of Mr. Levering that the matter of fixing date be referred to the Executive Committee prevailed.

The motion of Mr. Matthews that the Board adjourn, subject to call of the President, prevailed.

CHARLES DOWNING.

President.

CHARLES F. KENNEDY,

Secretary.

FEBRUARY 1, 1898.

Pursuant to call of the President, the Indiana State Board of Agriculture met in Room 12, Capitol Building, Indianapolis, Charles Downing presiding, all members present.

Minutes of January 4 and 5 were read and approved.

The motion of Mr. Niblack that the Board appropriate a sum the same in amount as was appropriated to premiums in 1897 prevailed.

The motion of Mr. Niblack, that the Board go into Committee of the Whole on the revision of the premium list, with W. W. Stevens in the chair, prevailed.

REPORT OF THE COMMITTEE OF THE WHOLE.

W. W. Stevens, Chairman, reported that the committee had examined the rules and regulations governing the awarding of premiums and managing the exhibition, and that it had revised the various classes, and moved the adoption of the report, which motion prevailed.

The motion of Mr. Jones, that the date of the State Fair be fixed for September 12 to 17, 1898, prevailed.

The motion of Mr. McDonald, that the selection and purchase of tickets be referred to the Executive Committee and the Superintendent of Admissions, prevailed.

The motion of Mr. Jones, that the matter of platting and planting a portion of the Fair Grounds in trees be referred to the Executive Committee, with instructions that they confer with the Indiana Horticultural Society and that the Board recommend that the same be done, prevailed.

The motion of Mr. Howland that the serving of dinners by the Board be abandoned prevailed.

The motion of Mr. Jones that the Board assign a room in the Administration Building for use by the State Grange during the Fair prevailed.

The President appointed as Committee on Salaries, James E. McDonald, H. B. Howland and Mortimer Levering.

REPORT OF COMMITTEE ON SALARIES.

Members, five dollars per day and five cents per mile for each mile traveled.

Assistant Superintendent, three dollars per day and actual mileage.

Secretary, eighteen hundred dollars per annum, and all clerical duties to be paid for by the Secretary.

Treasurer, five hundred and fifty dollars per annum, he to pay all assistants and ticket-seller.

Janitor, one dollar per day, including Sunday, free use of dwelling, free garden, free gas for cook stove, one heater and lights, privilege to keep cow and chickens.

General Superintendent, five dollars per day and five cents per mile for each mile traveled.

Judges, five dollars per day and actual mileage.

JAS. E. M'DONALD,
H. B. HOWLAND,
MORTIMER LEVERING,
Committee.

The motion of Mr. Jones that the President appoint a committee of three to represent the Board in matters relative to an exhibit at the Paris Exposition prevailed.

Committee—Messrs. Jones, Stevens and Matthews.

The motion of Mr. Jones that the President appoint a delegate to represent the Board at the meeting of the American Maize Propaganda in the city of Chicago prevailed.

Delegate—Chas. F. Kennedy.

The President announced the following as members of the Executive Committee: Claude Matthews, Mortimer Levering, Mason J. Niblack and M. S. Claypool.

The motion of Mr. Howland that the Board adjourn, subject to call of the President, prevailed.

MEETING OF EXECUTIVE COMMITTEE, APRIL 20.

All members of committee present and President Downing in the chair.

On motion of Mr. Matthews, the contract for printing 10,000 premium lists of sixty pages was awarded to Wm. B. Burford at \$187.50.

The motion of Mr. Levering that the Board purchase a steam boiler for the pump at grounds prevailed.

The motion of Mr. Levering that the Superintendent be instructed to grade the plaza in front of the grand stand, making it suitable for show of horses and cattle, prevailed.

The motion of Mr. Niblack that the President be instructed to make contract with Mr. Howland for care of race track, at a cost to the Board of \$100 per month, from May 1 to October 1, prevailed.

The motion of Mr. Matthews that the Janitor be instructed to collect rent for stalls at the rate of \$1 per month for all stalls occupied, and that the payment of this will secure to the tenant the use of the stall and track, prevailed.

The motion of Mr. Niblack that the Board offer a premium of \$25 for the greatest variety of colored corn prevailed.

MEETING OF EXECUTIVE COMMITTEE, MAY 24.

All members present, Mr. Downing in the chair.

The motion of Mr. Claypool that a new fence be built on the inside of the track prevailed.

Complying with the request of Quartermaster-General B. A. Richardson that the Board select an appraiser who shall, together with an appraiser appointed by himself, proceed to make an estimate of the damage to buildings and grounds, on account of the occupancy of said buildings and grounds by the Indiana National Guard and Federal troops up to date of May 24, Mr. Matthews moved that the President appoint such appraiser, which motion prevailed.

Appraiser appointed—The Secretary.

The motion of Mr. Matthews that the offer of Mr. Haggard of \$125 for the score card privilege be accepted, and that the Superintendent of Privileges be instructed to give him the contract, prevailed.

MEETING OF EXECUTIVE COMMITTEE, JUNE 23.

The motion of Mr. Claypool that the Board appoint none but uniformed police to patrol the grounds during the Fair prevailed.

The motion of Mr. Levering that the work of advertising in the press of the State be directed by Mr. McDonald prevailed.

The motion of Mr. Levering that the Board execute a lease to Parry Manufacturing Company, permitting them to erect an exhibit building on the north side of Eastern avenue and immediately in front of Central avenue, prevailed.

MEETING OF EXECUTIVE COMMITTEE, JULY 15.

All members of the committee present, and Mr. Downing in the chair.

The motion of Mr. Claypool that the loop at the street car entrance be enlarged, with additional entrances to the grounds, and that the platform for loading be lowered to a level with the tracks, prevailed.

The motion that the President and Secretary secure an estimate of the cost of repairing the light plant of Kissell, and a further estimate for lighting the grounds and buildings, prevailed.

Adjourned to July 20.

MEETING OF EXECUTIVE COMMITTEE, JULY 20.

The Committee on Lighting the Grounds reported that the Kissell plant was in very bad condition, and that it would be necessary to light the buildings with incandescent lights and the grounds with arc lights.

On motion of Mr. Matthews, the committee agreed to accept the offer of the Pain's Fireworks Company to produce the "Battle of Manila" and fireworks display, and to pay for the same the sum of \$3,500, when the contract shall be fulfilled by the Pain's Fireworks Company.

The motion of Mr. Claypool that no complimentary tickets be good at grand stand during the production of the "Battle of Manila," except the tickets issued to the press, prevailed.

The motion of Mr. Matthews that the President proceed to arrange for the lighting of the grounds and buildings prevailed.

On motion of Mr. Claypool that the President receive bids for the erection of women's rest room and for judges' and timers' stand prevailed.

MEETING OF STATE BOARD, SEPTEMBER 15.

Upon call of the President, a quorum of the State Board assembled in the room of the President in the Administration Building, at the grounds, September 15, Mr. Downing presiding.

The motion of Mr. Howland that the Fair be continued over Saturday prevailed.

MEETING OF STATE BOARD, SEPTEMBER 17, 1899.

Board assembled in rooms of President in the Administration Building; all members present, and Mr. Downing presiding.

The motion of Mr. McDonald that the President appoint a committee to draft resolutions on the death of Mr. Matthews prevailed.

Committee Appointed—James E. McDonald, Aaron Jones and Mason J. Niblack.

The motion of Mr. Claypool that the Secretary be instructed to draw warrants to the amount of \$3,000 in payment for the "Battle of Manila" and the fireworks display by the Pain's Fireworks Company prevailed.

The motion of Mr. McDonald that the Executive Committee audit all bills of expense of Fair and improvements prevailed.

The motion of Mr. Howland that a vote of thanks be tendered to the city police for efficient service, and to Colonel Harry B. Smith for a detail of soldiers in time of need, prevailed.

The President announced the appointment of James E. McDonald to fill the vacancy on the Executive Committee caused by the death of Mr. Matthews.

MEETING OF EXECUTIVE COMMITTEE, OCTOBER 1.

All members of committee present, Mr. Downing in the chair.

The motion of Mr. McDonald that the Secretary be instructed to issue warrants in pay for all admission tickets that were improperly rejected by the ticket collectors prevailed.

The motion of Mr. Levering that the occupancy of all buildings by soldiers while being mustered out be referred to the President prevailed.

ANNUAL MEETING OF DELEGATE BOARD.

January 3, 1899.

As provided by statute, the Delegate Board of the Indiana State Board of Agriculture convened in the Rooms of the Board, Capitol Building, Hon. Charles Downing presiding, and all members of the State Board present.

Meeting called to order by Charles Downing, President of the State Board of Agriculture.

The invocation was pronounced by Rev. B. A. Jenkins, of the Third Christian Church, Indianapolis.

INVOCATION.

Our Heavenly Father, we thank Thee that Thy care has been over and round about us during the past year. We thank Thee for the great and notable year that has just past; we thank Thee that our country has been kept and prospered, and that it has been led to large duties and re-

sponsibilities. We thank Thee that harvest and seed time, that wind and rain and snow have not failed from the face of the land.

Our Heavenly Father, we beg of Thee, as we enter upon this new year with its new duties, that Thou wilt bless our country and State in every undertaking, and that the spirit of Christ may be seen in the institutions of our land. We thank Thee, Lord, that this State Board of Agriculture acknowledges Thy name at the beginning of its proceedings, and we ask that Thou wilt lead it into larger and wider and deeper fields of usefulness than it has ever known before. We ask Thy forgiveness of the mistakes and wrongs we have committed in the past, and unto Thee, through Jesus Christ, shall be our praises, world without end. Amen.

ADDRESS OF WELCOME BY MAYOR TAGGART, OF INDIANAPOLIS.

Mr. President and Members of the Indiana State Board of Agriculture—I have been asked by your Secretary and President to extend to the members and delegates of this Association a word of welcome on behalf of the city of Indianapolis. I assure you that not only this annual meeting and its members are welcome, but the members of the State Board of Agriculture, which gives the State Fair, are always welcome to Indianapolis.

In taking the State of Indiana as a whole, I doubt if there is a State in the Union which has within its confines so many things of which the people ought to be proud. Indiana has a State pride in that which is within its State—its minerals, coal, gas, its climate, soil—in fact, everything; and I feel that Indiana should have a State pride in its State Fair, and we should endeavor to see that it is the best fair held in any State in the Union. I know that the citizens of Indiana concur in this view, that every effort should be made by Indianapolis to see that the State Fair is successful and to give it such co-operation as will assist in bringing it to perfection.

It is true that the State Board in recent years may not have had much to their credit on the financial side of the ledger, but that was not their fault, and last year they had all preparations made to give the best exhibition ever held in this city. But, notwithstanding that continuous rain ruined the ripe prospects, the city derived benefits from it. I believe that every railroad in Indiana, that every railroad that centers in Indianapolis, that the Board of Trade, the Commercial Club and local industries should join hands in welcoming to Indianapolis and assisting in making a success of the State Fair every year.

As I said before, Indiana is proud of the things within its confines, and so it should be of the State Fair. In taking up this matter, I believe, with

this body of intelligent gentlemen, who have devoted years to bringing to perfection the different articles and things that are exhibited at a State Fair, that the people who largely benefit by it, those of the State and those of the city, should join hands with this Board in making it a success.

Now, without detaining you longer, I wish to extend to you a cordial and hearty welcome to the city of Indianapolis, and I am here to assure you that Indianapolis will do its duty in assisting with the State Fair when it is called upon.

Mr. Stevens, Vice-President, presided while the President, Mr. Downing, read his address. Mr. Stevens requested that all pay attention to the recommendations which Mr. Downing would make in his address, and appointed as a committee to consider the address Mason J. Niblack, Aaron Jones, Robert Mitchell and James E. McDonald.

PRESIDENT DOWNING'S ADDRESS.

Gentlemen of the Indiana State Board of Agriculture—In pursuance of the requirements of the charter of the Indiana State Board of Agriculture, we have met here at this time for the purpose of deliberation and consultation as to the wants, prospects and conditions of the agricultural interests throughout the State, and for the transaction of such other business as the interests of the Board may require.

It is a long-established and time-honored custom for the President of the Board, at these annual meetings, to review the business transactions of the Board for the past year, offering such suggestions and recommendations for the future as in his judgment are of sufficient importance to be brought to your attention.

Perhaps the most important matter affecting the interests of the Board, from a financial standpoint, had it been successful, was the effort made to obtain a rate of one cent per mile during the week of the State Fair on all railroads entering into Indianapolis, within certain limits, and a one-way rate on all freight lines for exhibition horses. The Executive Committee, after several unsatisfactory and ineffectual meetings with the local managers of the passenger and freight traffic associations, authorized the President and Secretary to represent this Board on a committee appointed by the Board of Fair Managers to present the matter of reduction of passenger and freight rates to the eastern, central and western passenger and freight associations at Chicago. A committee consisting of Messrs. W. W. Miller and J. W. Fleming, of Ohio; John Cownie of Iowa;

Charles T. Kennedy and Charles Downing, of Indiana, and J. Irving Pearce, of Illinois, met the managers of these traffic associations in the city of Chicago on the 8th day of March, 1898, and were given a respectful and patient hearing. The result of our efforts will appear from the following report of the committee:

To the American Association of Fairs and Expositions:

Gentlemen—The undersigned committee appointed at the last annual meeting of this association to confer with the Central Railway Traffic Association relative to reduced passenger rates to the several State fairs and the securing of freight rates on class horses equal to rates charged on other exhibition animals, beg leave to submit the following report:

On March 8 the committee met at the Sherman House, in Chicago, and proceeded to organize for the purpose of appearing before the railway traffic associations in session at that time.

Through the kindness and interest of Col. J. Irving Pearce, President of the Illinois State Board of Agriculture, your committee was first granted an audience with the Chicago sub-committee of the Central Passenger Association, before which body it appeared and urged, as earnestly as possible, the granting of cheap excursions and a one-cent-a-mile rate by the railways for carrying passengers to the several State fairs. Strong arguments were presented by the several members of the committee in support of the requests made. Your committee was very cordially received by the railway representatives, who, upon the retirement of the committee, took action, as appears from the minutes of the meeting, copy of which was submitted to the members of the committee, as follows:

REQUEST FOR REDUCED FARES FOR STATE FAIRS UNDER AUSPICES OF
NATIONAL FAIR MANAGERS' ASSOCIATION.

By appointment there now appeared before the meeting a committee representing the National Fair Managers' Association, and composed of Mr. J. Irving Pearce, President Illinois State Board of Agriculture; Mr. John Cowrie, President Iowa Agricultural Society; Messrs. W. W. Miller and J. W. Fleming, Secretary and Assistant Secretary; Downing and C. F. Kennedy, President and Secretary, respectively, of Indiana State Board of Agriculture, who had by a recent meeting of their organization been constituted a committee to wait upon the several passenger traffic associations having jurisdiction over the territory in which their interests are situated.

The several members of the committee, in behalf of the respective organizations they represented, claimed that owing to the frequent reductions of rates to one fare for round trip to the cities at which the State fairs are located, the attractions they offer fail, at the same rate of fare,

to induce remunerative attendance, and, as a means of offsetting this untoward condition, desire the assistance of the railways to the extent of granting for each State Fair, including the St. Louis Fair and Exposition, in addition to the round-trip rate of one fare usually accorded, a rate of one cent per mile each way, on Wednesdays and Thursdays, good returning on Friday, from a radius of two hundred miles, the cheaper rate to apply at least on the direct lines. The committee further urged that unless they could have the support of the railway in the direction indicated, they would by reason of insufficient attendance be forced to abandon their State fairs. It was further argued that the National Fair Managers' Association tends to promote travel, for the reason that the State fairs occurring in succession, there is a following of exhibitors and many of the attendants.

The committee, after thanking the meeting for the privilege of speaking upon the subject, withdrew, whereupon careful consideration was given the application presented, resulting in offer of the following:

Resolved, That as, in our opinion, the rates and arrangements applied for are just and reasonable, we recommend to the Central Passenger Association that for State fairs in its territory, under the auspices of the National Fair Managers' Association, a rate of one cent per mile be given on Wednesdays and Thursdays, good returning on following Friday, from a radius of two hundred miles, and that on other dates a rate of one fare for the round trip be accorded.

Adopted unanimously.

Upon motion, adjourned at 3 p. m.

A. H. WARRELL, Chairman.

R. E. PEPPER, Secretary.

Your committee next endeavored to gain an audience with the Central Passenger Association, but, the session of that body being closed, or about to close, we were only able to discuss matters with individual representatives and to present the following petition to Commissioner F. C. Donald, of said association:

Chicago, Ill., March 9, 1898.

Central Passenger Association:

Gentlemen—The undersigned committee, representing the American Association of Fairs and Expositions, would most respectfully represent to your body that at the present time a crisis confronts the managers of these annual meetings, and that methods heretofore assuring success no longer can be depended upon to secure the attendance of large numbers of people at our annual State fairs and expositions. In the line of special attractions we find it difficult to secure such novelties as will attract attention, and the present year, with the Trans-Mississippi Exposition at

Omaha, we realize that, unless extra inducements are offered, all our efforts to insure success must end in failure.

Assuring you of our high appreciation of your kindness in the past by granting a one-fare rate to these annual gatherings, we realize that, owing to the many cheap excursions, at much lower rates, planned by the railway companies, a one-fare rate no longer produces such results as it did in former years.

We would, therefore, most respectfully ask that you give this matter your most thoughtful consideration, and trust that after a full investigation you will find that in granting excursion rates for two or three days of the State fairs and expositions at a low figure, such action will not only conduce to the success of our fairs, but also in a marked degree redound to the benefit of the railway companies.

Knowing, as we do, that no other factor has aided so materially in developing the agricultural resources of our country as our State fairs and expositions, even the thoughtless and indifferent could not fail to see the great improvement being made in the breeding of live stock, the production of fruits, vegetables and grain, thereby creating an emulation that has more than doubled the freight traffic of our railways. With the officers of the fair and exposition associations, the work assigned to them is not in the great majority of cases given any compensation, but is merely a labor of love, and in our extremity we appeal to you to assist us in still further developing our great agricultural and mechanical interests by fixing a special low passenger rate, in addition to the one fare for the round trip, for the State fairs and expositions of 1898, in the full belief that a much larger attendance would thus be secured, and the increased interests would bring forth, in due time, an abundant harvest that would prove of great value to the railway companies.

We have the honor to be,

Yours most respectfully,

COMMITTEE OF THE AMERICAN ASSOCIATION
OF FAIRS AND EXPOSITIONS.

W. W. MILLER, Chairman.

The following courteous reply was received:

Chicago, Ill., March 9, 1898.

Mr. W. W. Miller, Chairman of Committee American Association of Fairs and Expositions, Office of the Ohio State Board of Agriculture, Columbus, O.:

Dear Sir—I beg to acknowledge the joint favor of yourself and colleagues addressed to the Central Passenger Association under date of March 9. We will have pleasure in listing the subject touched upon therein for consideration at the next meeting of this association, and, as we under-

stand that your committee desires a hearing by the meeting, will cheerfully undertake to secure for you an audience. The date of the next meeting of the association is Wednesday, April 6.

Yours truly,

F. C. DONALD, Commissioner.

Your committee then made an effort to reach the Central Freight Traffic Association, but, failing, after repeated efforts and a wait of two days, to gain a personal audience, succeeded in placing before that body the following petition:

Chicago, Ill., March 9, 1898.

The Central Freight Traffic Association:

Gentlemen—At a recent meeting of the American Association of Fairs and Expositions a committee was appointed to confer with the Central Freight Traffic Association relative to the discrimination that has been made within your territory as to freight on horses, which discrimination is operating against the success of the fairs where it applies, and as a natural consequence must be against the best interests of the railways, especially the passenger traffic.

What we desire, and most earnestly urge, is a modification of your rates, so as to transport to and from our expositions class horses at one-half freight rate, the same rate that is granted to other classes of live stock, and under the same conditions, viz., to pay full freight going, and where no change of ownership occurs, to be returned free.

A few briefly stated facts with reference to the concessions that were formerly made by the railways to State fairs generally may aid in determining the policy for the present, or at least give warrant for a modification in the freight arrangement, so as not to exclude horses, that is being urged by this committee.

What was true in former years has general application in all the States, as there was a general rule among railways for uniformity in these matters. Going back as far as 1864, we find from that time up to 1883 the railways arranged with the State fairs, and general publication was made, that all freights for exhibition would be transported free. There were no exceptions and no discriminations against any class of exhibits, the only condition being that exhibitors should pay freight from the point of shipment to the fair, when by the stamping of freight bills by the secretary of the fair or the presentation of his certificate that the shipment had been on exhibition, they were returned free, and the amount originally paid was refunded.

The result of these liberal extensions on the part of the railways was to bring out the largest possible exhibits, especially of live stock. Many animals changed ownership, as they do now during the fairs, and for such the railways received full freight both ways, as well as from the herds and stables from which they were taken, as broken exhibits were not returnable free under the arrangements. In 1883 the general manager

of one of the great trunk line railways asked for a conference over the matter of State fair freights. He held that the railways were giving for fairs very low passenger rates, besides providing special excursions, and he felt that some change was justifiable and should be made in the freight arrangements, and suggested that it would be fair to charge one way instead of carrying both ways free. Fair boards conceded the justice of the matter, and it was so advertised, and no great objection was manifested on the part of the exhibitors. A very few years later, without consultation, an exception was made to speed horses, and to this neither the boards nor exhibitors objected, because speed horses were very rarely returned directly from the fair to the point from which shipment was made, but continued on long racing circuits during the season, and could not avail themselves of the half rates under the rules; but when a year or two later the railways made another exception, including all horses, it was then the evil results to the fair began to be felt, and they have continued growing more serious up to the present time. Class horses are now being exhibited in very limited numbers, compared with former years, and the only complaint we have from exhibitors and the only reason assigned for not exhibiting is this matter of full freight rates both ways. Other exhibits of live stock have not been affected.

If this discrimination against horses is because of values, the claim does not hold good, because the pure breeds of cattle are sometimes greater in value and are not so easily handled as are horses. The horse exhibits attract more visitors to the fairs than any other class of animals, and we firmly believe that our patronage has been reduced on account of short horse exhibitions more than we are able to determine, all of which affects the passenger traffic of railways very much more, we are sure, than the freight received on the limited number of horses that of late years are being brought to our fairs.

The State fairs held within the limits of the Western Freight Traffic Association are still accorded the same freight rates on horses that are accorded to other classes of animals, the only exception being speed horses, to which no objection is made, and this committee most respectfully asks that your Central Association will take the same care and accord the same concessions to the fairs within your territory.

We believe it would be wise and good business policy to place class horses under the same benefits as are extended to other animals, and make the exception only for race horses, and we hope the Central Traffic Association will so decide. Respectfully,

W. W. MILLER, Ohio, Chairman;
JNO. COWNIE, Iowa,
CHAS. F. KENNEDY, Indiana,
CHAS. DOWNING, Indiana,
J. IRVING PEARCE, Illinois,
J. W. FLEMING, Ohio,

Committee.

After waiting several days for some reply to the petition, the Chairman addressed another communication on the subject to Mr. J. F. Tucker, chairman of the association, to which the following reply was received:

Chicago, March 18, 1898.

Mr. W. W. Miller, Chairman Railway Committee, American Association of Fairs, etc., Columbus, Ohio:

Dear Sir—This morning brings your kindly letter of the 15th. It seems to me you take rather a pessimistic view of the result of fairs and expositions by the continuance of the rule of charging full freight rates in both directions on horses. The liberal premiums given to the owners of horses for exhibition at these popular gatherings, i. e., fairs and expositions, certainly are a strong inducement for their exhibition, while the liberal policy in the way of reduced rates for passengers and reduced rates for exhibits other than horses tend to draw the people. In themselves horses have ever been, to my mind, one of the most effective advertisements that have ever been devised, and must redound largely to the finances of the owners of horses in such exhibitions.

There is no point as to the handling of horses or other live stock—the one is about as easy to handle as the other. The risk, however, as to horses is much greater, in my judgment, and I think without question I can speak for the entire membership of this association—some fifty roads—that, taking what the railroads do as a whole towards the encouragement and aid in making the State, county and other fairs and expositions successes, is all they should be asked to do, particularly when considering the low rates that now prevail for the services rendered in the transportation by the railroads.

Yours very truly,

I. F. TUCKER, Chairman.

Through correspondence an audience with the Central Passenger Association was secured at its May meeting in Chicago. The chairman of this committee could not be present, but was represented by Mr. J. W. Fleming, the Secretary of our American Fair Association.

The committee was very kindly received, and discussed with the passenger association the claims for a cent-a-mile rate and popular excursions for the various State fairs. The passenger association took the matter under advisement and agreed to report at a future meeting. It seems the subject was discussed at "future meetings," but no decision rendered until the meeting in July. The following letter gives the result:

Chicago, July 28, 1898.

Mr. J. W. Fleming, Assistant Secretary Ohio State Department of Agriculture, Columbus, Ohio:

Dear Sir—Adverting to your favor of the 27th ultimo and my reply under date June 28, I beg to advise that the members of this association,

at a meeting held on the 13th instant, having reviewed the petition and arguments presented by yourself and members of your committee to a session of the association convened in Chicago in April last, and having carefully considered the basis for the excursion fares recommended by your committee, it was the sense of the meeting that compliance with your petition would, by reason of the large number of State and district fairs and expositions annually held in the territory of the Central Passenger Association, result in blanketing the lines of the association for a period of at least sixty days during the season of these expositions with such abnormally low fares as would unprofitably discount and in all probability demoralize the revenue realized from regular travel. In this conclusion it was

Resolved, That the basis of the excursion fares requested by the American Association of Fairs and Expositions be respectfully declined.

As you perhaps understand, the resolution is addressed to the one-cent-per-mile rate urged by your committee. It has been the practice of the association to concede to the fairs and expositions conducted in its territory excursion rates of one regular fare for the round trip, and it is believed that such concessions present a sufficient inducement to attract such of the public as are interested in meetings of this character.

Yours very truly, F. C. DONALD, Commissioner.

[Copy to Messrs. Chas. Downing, President Indiana State Board of Agriculture, Indianapolis Ind.; Chas. F. Kennedy, Secretary Indiana State Board of Agriculture, Indianapolis, Ind.; J. Irving Pearce, President Illinois State Board of Agriculture, Sherman House, Chicago, Ill.]

Your committee exhausted every effort in its endeavors to properly place before these railway associations the claim of the State fairs for better passenger rates and a modification of the freight rates on horses, and while not securing for this year all the requests made, we believe considerable good was accomplished by getting in closer touch with the railways, and that desirable results will follow. The demands of this association are right and just, as attested by some of the railway associations, and success to the fairs and the railways in the matter of fair traffic very plainly requires that they be generally acceded to; and we recommend that the efforts of this association to secure the same be continued with even renewed energy.

Respectfully submitted,

W. W. MILLER, Ohio, Chairman;
J. IRVING PEARCE, Illinois,
D. R. M'GINNIS, Minnesota,
JNO. COWNIE, Iowa,
CHAS. DOWNING, Indiana,
CHAS. F. KENNEDY, Indiana,
J. W. FLEMING, Ohio,

It is to be hoped that the Board of Fair Managers will renew its effort and continue to keep it up until the railway companies will make these concessions, which are so reasonable and just, for the people of this great agricultural State. This matter is of as great importance to the agricultural and fair-going people of the State as it is to the managers of the State Board, for these annual exhibitions are given for their benefit and to advance the agricultural and industrial interests of the State. And the railroad companies ought, in some manner, to be impressed with the necessity and importance of making these reasonable and just concessions.

In justice to the railroad companies entering Indianapolis it is proper to state that, while they did not make the concessions asked for, they did give the people living on their respective lines the advantage of special excursion trains at the usual half-fare rates; and for this we are very grateful.

After the President's first call for troops, and before Governor Mount had issued his call to the State troops, the Executive Committee tendered to the Governor the free use of the Fair Grounds for the State troops while in camp. The grounds were occupied by the troops under these conditions during the whole of the summer and during the Fair. Considerable damage was done to buildings, fencing and grounds during the occupancy by the soldiers, and an adjustment of the damage done up to the 26th of May, 1898, was had, which was satisfactory to the committee, and the sum of \$710.75 received from the United States Government through the State turned into the treasury. The damages occasioned by the occupancy of the soldiers since that time have not been adjusted, but have been estimated by the Superintendent at \$5,500 in round numbers. The committee's action respecting the tendering of the Fair Grounds to the Governor for the purposes mentioned has been approved by the full Board, and I trust that you indorse it.

The incapacity and worn-out condition of the hot-air pump at the pumping station on the Fair Grounds required a large expenditure of money each year for repairs, and then it was difficult to keep it in working order. It became so troublesome that at times it was impossible to depend upon it to supply the water necessary for the ground. The committee caused an investigation to be made of it by an expert engineer, who gave it as his opinion that the defect could not be remedied, even if its capacity was sufficient.

The committee, acting upon this opinion, and after receiving competitive bids, purchased a steam boiler and had it placed and connected with the engine which was used as an auxiliary to the air pump, since which time there has not been the slightest trouble with the water works system.

Besides this improvement, there have been built and furnished a woman's rest building, a new starters' and judges' stand, an electric power building, the grounds and most of the buildings have been wired for the

use of electricity, new fences have been erected in front of the grand stand, a plaza has been provided in front of the grand stand for showing class horses and cattle. The entrances and exits at the street railroad loop were remodeled and enlarged, so as to accommodate large crowds and prevent accidents. Nearly all of the dry wells and water drains and much of the water mains were repaired, as were all the outside fences and the gravel walks. The interior of the Art and Agricultural buildings were remodeled. All of these improvements aggregated the sum of \$6,100.

These improvements were absolutely necessary for properly conducting the Fair, and were essential for the comfort, safety and convenience of its patrons.

Our experience in the last year has demonstrated and convinced us beyond any question that we need a complete system of drainage and sewerage in case of excessive rainfall during the Fair. This would not involve a very great outlay of money, as the ground is comparatively level, the outlet close and the fall ample. No improvement can be made to the grounds which would be more conducive to the comfort and health of the patrons of the Fair during these heavy downpours of rain. I can not urge this recommendation too strongly for the consideration and action of the new Board. In this connection I would also suggest that when the race track is resoled a good quality of clay be used instead of the gumbo soil. It has been repeatedly and forcibly demonstrated that our gumbo track is not a wet weather track and can not be made one unless clay is used. The Pointer-Patchen race proved this to our satisfaction and to the disappointment of the largest crowd of people that ever assembled on the Fair Grounds.

We can not control the elements during Fair week, and since this is so, we must make the best possible provision for carrying out the race program in the event of a rainy day or a rainy week.

I believe that meritorious night attractions given on the Fair Grounds during the week of the Fair will prove both popular and profitable to the Board. But I feel that the Board owes an apology to the people who attended the Battle of Manila, especially those who saw it on the opening night.

We were led to believe, from the reputation of Pain's Fireworks Company, as fireworks manufacturers and operators of fireworks displays, and the statements made by their agent to the Executive Committee, that the "Battle of Manila" would be the greatest production and display of fireworks ever given in Indianapolis or the State. To say that the Board was disappointed is putting it mildly. We have information that the production was tame compared with that given by the same company in other cities, and did not approach the production given at "Manhattan Beach" or the expectations of the Board.

The Executive Committee, by and with the consent of the Board, authorized the employment of the city police during the week of the Fair. While this was a new departure from the old custom, it was eminently satisfactory, both as to service and cost. No better service could have been desired. It was perfect.

The Mayor, Chief of Police and the members of the detective and regular police force detailed for service during the Fair are entitled to and deserve our hearty thanks.

I have taken some pains to ascertain whether or not the expense for this service was excessive and whether the Board was justified in its course. The records show that the expense is a little less than the average year, taking in a period covering eleven years.

In 1877 the Board paid for police service.....	\$998 25
In 1881.....	610 55
In 1882.....	603 61
In 1883.....	483 25
In 1886.....	589 00
In 1887.....	664 25
In 1888.....	418 75
In 1889.....	781 97
In 1890.....	811 14
In 1898.....	610 00

It will be seen from these figures that the average expenditure for police service during these years was \$670. The reason for taking the figures for these years is that the expense for police service is not given separately in the last reports. It is included in the total expenses for running the Fair. In considering this expense it must be borne in mind that during the years mentioned the State Board gave no night attractions, while this year, on account of the "Battle of Manila," we were compelled to have a larger force at night than during the day.

So you see that with the ordinary State Fair, without night attractions, the city police would be the most economical for the Board.

You will learn from the financial reports of the Secretary and Treasurer that the last Fair was not a financial success. It is hardly necessary to mention the cause. It was a record-breaker in one respect; that is, that not a race was started during the week of the Fair. Those who have conscientious scruples against horse racing at fairs can not complain of the last Fair in this respect.

The incessant rain during the week made it impossible to start any of the races. All the owners of race horses and the race-loving patrons of the Fair were, of course, very much disappointed. But, notwithstanding the rain and mud, the exhibition in the other departments was the best

made in years. On every hand it was remarked that the display was wonderful. And the Board was the recipient of many congratulations for the excellent exhibits and the manner of conducting the Fair.

No questionable features of any kind or character were permitted to enter the gates of the grounds at any time, and I enjoin on the future management that this precedent be strictly followed.

We must not become discouraged because we did not accomplish all we desired to this year. Nothing but the extreme rainy weather prevented us from having one of the largest attendances in the history of the State Fair. It was remarked on all sides that the people wanted to come to the Fair, if the weather would give them a chance. And the Superintendent of Gates reported that up to 10 o'clock on Thursday morning more tickets had been sold than on any previous Thursday since he had served in that place. And the exhibits in all departments were certainly larger than usual.

The State Board has seen darker days in its history. In looking over the records I noticed that in 1884 the indebtedness of the Board was in excess of \$80,000, \$60,000 of which was drawing 10 per cent. interest. In 1876 the indebtedness of the Board amounted to \$89,700.

The present indebtedness, as you will learn from the Secretary's report, is \$4,082.23. So I say the Board need not at all be discouraged. One good year will wipe out this debt and leave us a surplus. The Board had a larger debt in 1897, and wiped it out entirely with the proceeds of the Fair of that year.

The object of the Legislature in creating the State Board of Agriculture was for the encouragement of agriculture. And with this end in view, and to carry out the full purpose and intention of the Legislature in creating this institution of the State, it has been giving these annual educational exhibitions for almost a half century, nearly all of them in the city of Indianapolis.

The wisdom of the members of the Board who permanently located the State Fair Grounds in the capital city of the State can not now be questioned. It would have been unwise to have gone elsewhere, if the convenience and comfort of persons who attend the State Fairs and the facilities for reaching the State Fair are to be considered. Being thus permanently located at the capital, it becomes a question of very great importance as to how we can best enlist the interest and support of the citizens of this city to assist us in making the State Fair a success, not from a financial standpoint alone, but to make it such an exhibition as will stimulate and educate the visitors to the State Fair, and especially those interested in agriculture, so that its influence will be felt throughout the State. If we can not accomplish this result, the mission of the State Fair is at an end. We must educate as well as entertain. That is our commission.

For the past few years the State Board has been ably and generously assisted by the counsel, advice and support of the Board of Trade and the Commercial Club of Indianapolis. And we have profited by their suggestions, and I sincerely hope and trust that the State Board may always be able to keep in touch with these institutions and the enterprising citizens of Indianapolis generally, and will seek their advice in matters pertaining to the State Fair and its welfare. We must have the good will of Indianapolis for various reasons, one of which is, it is one of the attractions to State Fair visitors.

We are highly fortunate in having at this time as Governor of the State a practical, educated farmer. Indiana is essentially an agricultural State, notwithstanding the great influx into it of manufactories since the discovery of natural gas. And yet a very small amount of money, compared with that devoted to other educational interests, is expended in securing instruction to young men in this greatest industry of our State. Young men have grown to look upon farming as a very narrow field for a life work, as lacking the opportunities which are offered in the professions or in business in the large cities. Governor Mount believes in letting the young men of our State know that, to be educated, thinking young men, agriculture, or, if you please, farming, affords the highest opportunities for success. It is due to his interest and effort that Purdue University has been distributing a series of leaflets at public expense for use in the public schools and particularly in the country schools.

These leaflets are distributed through Purdue University, and in some slight degree take the place of text-books and regular lines of study in agriculture, which certainly ought to be incorporated in the curriculum of our public schools. The growth of our great cities is one of the threatening evils of our country. The immigration of the people from the country continues to grow from year to year. The agricultural interests still progress, but largely through the efforts of a few men who see through the open door of the farm a sure, safe road to success awaiting the man who brings with him the ability and energy which produces but meager results in other activities of life. The State Board of Agriculture and all agricultural interests of the State owe their sincere thanks to Governor Mount, Purdue University and the farmers' institutes in their efforts to increase scientific agricultural education throughout the State.

It was suggested by my predecessor, Hon. Chas. B. Harris, in his address delivered at the last annual meeting, that this Board should surrender to the State its rights as a private corporation and ask the Legislature to pass an act creating the State Board of Agriculture, making it a public corporation—in other words, a State institution in fact—so that it could claim the protection, aid and support of the State. I was very much in favor of this recommendation and advocated the change suggested enthusiastically. But since I have investigated the question fully, I have concluded that this Board is as much a State institution under its pres-

ent charter as it is possible for it to be under any new charter that could be framed to subserve the agricultural interests of the State. All of the property owned or controlled by the Board belongs to the State, and the Board is only empowered to hold the same for the general objects of the Board. It is exempt from taxation. No debt or liability can be created or contracted upon faith or credit of its property; nor can the Board encumber the same with any lien or charge except by the express authority of the Legislature. Its meetings and expenses are limited by the charter. The members of the Board are elected by the presidents of the county agricultural associations, and are *required* to make an annual report to the General Assembly of the State of the receipts and expenditures of the Board, together with such proceedings of the State Board and reports from county agricultural societies, as well as a general view of the condition of agriculture throughout the State, accompanied by such recommendations as they may deem interesting and useful.

The charter also provides that a convenient room be provided in the Capitol for the use of the Board.

These provisions of the charter would seem to indicate that the Legislature regarded the State Board as an institution of the State. Besides all these provisions, the Legislature has from time to time recognized the Board in a substantial way by making appropriations for the purpose of paying awards and premiums to exhibitors at its annual exhibitions.

I am well aware of the fact that the Supreme Court of the State, in a case brought to test the constitutionality of the act of March 4, 1891, abolishing the present State Board of Agriculture, held that the State Board of Agriculture, as created under the act of February 14, 1851, was a private corporation, and that the Legislature could not abolish it for the reason that the act of March 4, 1891, impaired the obligation of contracts. And I am also aware of the fact that since that decision was made objection is urged by those unfriendly to the State Board whenever an appropriation is asked for or made to the Board. Yet the court in the opinion in that case says that "the institution, the corporation, exists for the benefit of the people of the State." The Trustees elected have no financial interest in the property of the corporation in such a sense as that they can sell it and appropriate the proceeds to their own use.

The court further says of the State Board as constituted at present: "It is in a sense an educational institution. It seeks to bring together the people engaged in agricultural pursuits, as well as those engaged in manufacturing farm machinery and other articles adapted to use in the cultivation of the soil and harvesting crops, and other articles also used by the public, as well as those engaged in the raising of stock, and to exhibit to those in attendance the crops resulting from the various methods of farming and the various machinery manufactured for the use of those engaged in agricultural pursuits, as well as the various breeds of stock, and give to the people of the State, and particularly those engaged in ag-

gricultural pursuits, an opportunity of discussing the various methods of farming and farm implements used and the different breeds of stock raised, and to educate the people in this way in the pursuits of agriculture, and to educate and improve the condition of the agriculturist, that they may gain a knowledge of the best methods of farming, best machinery to use and the best breeds of stock."

The State Board is not a private corporation in the sense that it is organized, managed and conducted for private gain. Whatever profits accrue to it belong to the State, and can not be appropriated to their own use by the members of the Board or any one else. It having been declared a private corporation, and that the Legislature can not abolish it, and it also having been declared to exist for the benefit of the people of the State, what legal or other objection can or ought to be raised to the Legislature making annual appropriations to the Board for the payment of premiums to encourage agriculture and the improving of live stock? So long as the money is used for the purpose for which it was appropriated, and not diverted or squandered, it seems to me at this time that there is absolutely no necessity for changing the law. But I am strongly impressed with the notion that it is the duty of the Legislature to provide liberally for the support of this educational institution, which has done so much to advance the agricultural interests throughout the State. Our Legislature ought to follow the precedents established by our sister States of Ohio and Illinois in this respect.

Since our last annual meeting the most distinguished member of the Board, and one of Indiana's most beloved citizens, has passed away. I refer to ex-Governor Claude Matthews, who died on the 28th day of August, 1898. His death was a sad blow to the State Board, as well as to the people of the whole State. At the time of his death he was a member of the Executive Committee, and since that time his wise counsel and timely judgment have been greatly missed. Always considerate of those about him and generous to a fault, Governor Matthews had endeared himself to every member of the Board, and not one of us but felt that his sudden passing away was a personal loss. He gave to his work, as a member of the Board, that same care and thought and energy which characterized his efforts in the larger affairs of life to which he was called by his fellow-citizens. He bestowed upon those with whom he came in contact, in the ordinary, everyday transactions of business, such sincere kindness and courteous consideration that even the most humble left his side with a new inspiration and ardor for his task. Unswerving in all of his ideas of the duties of life, he never faltered in his pursuit of what is highest and best in any line of work to which his abilities were directed, yet always with charity and encouragement for those who failed or were unsuccessful. No man can say he was ever humiliated or cast down by a word or deed from the great-hearted man whom we miss to-day from our counsels and whose place it will be almost impossible to fill. He was a man

of splendid ability. This, with his thorough devotion to that department of labor in which he might be engaged, made him a power among his co-workers. From the simpler duties of the farm he turned with facility to the greater and more complex duties of the affairs of State, and administered them with the same thorough business methods that he used in the conduct of the work upon his farm. No detail was too small to receive his careful attention. This insured the completeness with which all of his work was done. We feel that his loss to us is irreparable.

In recent years we have received the very best of treatment at the hands of the press of the State, both country and city, and particularly the city press. And on behalf of the Board I desire to express our thanks for the many favors received from this source. An unfortunate mistake growing out of the similarity of the colors of the press and general complimentary tickets brought forth some unfavorable criticism from the press after the last Fair. These mistakes must be avoided and guarded against in the future, if we expect to retain the good will and friendship of the newspapers.

I can not let this opportunity pass without sincerely thanking the officers of the Board for their uniform kindness during the past year. And I would be ungrateful, indeed, if I did not express my gratitude to the Executive Committee for the loyal support received at their hands. I am also indebted to the other members of the Board for the very great interest they have taken in the success of the Board and the very able manner in which they managed their several departments before and during the Fair. I can truthfully say that every member of the Board did his whole duty. I am happy to say that there has not been the slightest friction among the members or officers of the Board during the past year. May this always be so, is my wish.

The President announced the following Committee on Credentials: V. K. Officer, A. A. Bibler, J. L. Dunning.

Auditing Committee Appointed—Aaron Jones, W. W. Stevens, J. C. Haines.

Mr. Downing, President, appointed Mr. Howland, Mr. Mitchell and Mr. Jones a committee to invite Governor Mount to address the meeting and to conduct him to the room.

REMARKS BY GOVERNOR MOUNT.

Gentlemen of the State Board of Agriculture—It affords me pleasure to greet you at the beginning of this new year. The outlook for the farmer is most auspicious. For some years we have had a succession of great corn crops, and at this time we find the foreign demand so enlarged that prices are tending upward, notwithstanding the large yield. A minimum crop will insure strong prices for this cereal. Mutton, wool and beef command paying prices. With money plenty, with interest rates low, investments are likely once more to seek land. I believe we are in the early morning of a day of better profits for intelligent husbandry. Should we have a minimum year in the corn crop, we would at once have augmented prices. With the return of prosperity we find the outlook in agriculture most encouraging. The prices for mutton, for wool and for beef are indeed very gratifying, and it seems to me with the abundance of money and low interest we are likely to have larger investments in farm lands. I believe, gentlemen, at this time, the outlook for good investments is better in good farm land than in any other direction in which investments can be made. I believe in intelligence connected with agriculture, and States. The Secretary of Agriculture, Hon. James Wilson, with whom I commended its importance in his annual report. I shall call the attention can be found anywhere.

One year ago I addressed your honorable Board for a few moments upon the introduction of nature study into our public schools. This was intended to be the primary step in the introduction of the science of agriculture into our public school curriculum. In conformity with your action at that time, President Smart, of Purdue University, caused to be printed by the university 97,000 leaflets on nature study. In other States the work done in Indiana met with such approval that permission was asked to reprint these valuable leaflets. This initiatory step in the teaching of this important science has been commended in many parts of the United States. The Secretary of Agriculture, Hon. James Wilson, with whom I conversed on this subject, is in full accord with this movement and has commended its importance in his annual report. I shall call the attention of the Indiana General Assembly to this important movement. I desire to commend the Board for its prompt action upon the suggestion which I made at that time. The name you bear would indicate that you have a lively interest in all that pertains to rural life. If you are not interested in the promotion of farming, then your name is a misnomer and your purpose misunderstood.

Many European countries appropriate money for agricultural fairs to aid them in paying premiums, believing that such subsidies and in promoting the breeding of the best live stock and the production of the largest yield of crops and the finest fruits. So long as agricultural so-

cieties are conducted for such purpose, they must continue to be helpful to agricultural development.

I desire to call your attention for a brief while to another subject of vital moment, not only to the farmers but to all the people of our commonwealth. Good roads are inseparably connected with progress. Like abundant harvests, they contribute to the good of all. The isolation of the country home is the farmer's greatest barrier to progress. Bad roads enlarge this barrier. "Iron sharpeneth iron, so a man sharpeneth the countenance of his friend." This proverb reveals a truth found in every-day experience, that by friction of mind through frequent contact the intellect is quickened and the mind expanded. Conditions that tend to isolate should be removed as speedily as possible. Facilities for daily contact with the world's best thought and progress should be accelerated. The highest success, socially, financially and intellectually, cannot be attained until we have good thoroughfares. The restriction of marketing farm products to periods when the roads are passable prevents marketing to the best advantage, both as to time, cost and prices.

I heard a farmer in southern Indiana say that \$2,000 was lost to the farmers on hay alone on one road extending eight miles from the market into the country. This loss, which was sustained in one year, was caused by impassable roads when prices were best. One year's loss on one crop would have paid for improving one-eighth of the distance. This illustrates the financial loss caused by bad roads.

The farmer whose family is held in the thralldom of bad roads for a large part of the year is subjected to an ordeal that trammels progress, fetters social growth and retards intellectual development. The farmer who lives on a mud road will be likely to have all his environments in harmony therewith. He sees the passer-by plodding his weary way through the heavy roads, and likewise moves in a sluggish manner, goes with muddy boots into his home, sits down with hat on, chews his tobacco and spits in the fire. Such a farmer is apt to lose much of his pride and self-respect. His home has but little of brightness and good cheer and his family are subjected to the necessity of staying at home, or going out in a manner that humbles their pride, and as a result their dislike for the country is intensified. The farmer located upon a good thoroughfare, who sees the fine turn-outs rapidly hurrying by, the occupants handsomely dressed people, is inspired by the scene, steps quicker, thinks faster and keeps his home surroundings in harmony with what he sees. A sense of pride prompts him to greater efforts to have for his family a good conveyance, to provide about his barns good drives, free from mud, and to have about his home good brick or cement walks. His children go to school over good roads, his family go to church, to lectures, to town; they are in touch with the world's progress. The need of combining small country schools, the demand for township high schools, will heighten the need of road improvement. Rural free delivery of mail, so much needed among

our farmers, can never obtain except in localities possessing good thoroughfares, insuring rapid transit at all seasons of the year. Among all the countries that comprise the International Postal Union, the United States is the only country that fails to deliver the mail to the addresses. In thickly settled districts, where there are good roads, the conditions are ripe for the farmers to demand some consideration of fairness from the postoffice department. Hon. Perry S. Heath, first assistant Postmaster General, recommended and secured an appropriation of \$20,000,000 for experimentation in rural free delivery of mail. I am amazed that objection should be made to the appropriation of this paltry sum for so wise and just a purpose. Mr. Heath informs me that a senator from one of the Eastern States said to him, "You have acted unwisely in this recommendation. You will have these farmers demanding a rural delivery of mail and causing a great deal of trouble." I am astonished that an Eastern man should have the effrontery to speak slightly of the rights of the men who are contributing so much to the nation's wealth and power. The people who produce the food and fiber that feed and clothe the world must not be overlooked in their just demands. The past year the farmers of the United States, after supplying home demands, sent abroad \$856,000,000 worth of farm products. They bear a large part of the burden of taxation, and are justly entitled to some of the privileges accorded to others. Recently I was invited to go through the southwestern limited through mail train on the Pennsylvania railroad. I found the clerks engaged for hours distributing two publications from Augusta, Maine. I was informed by these mail clerks that in one day, on one through train, there were 115 sacks of this mail for the State of Texas alone. I was informed that this trashy stuff was handled by the government at a loss of six cents a pound. These large sacks, filled with papers wrapped and packed by machinery, probably contained 100 pounds to the sack. The expense to the government in one day, carrying this mail to one State, would pay the expense of two rural routes for one year. Before this Eastern Senator again criticizes the wise action of Mr. Heath, he should remember the farmers have some rights that even an Eastern senator should respect. These Eastern cities should no longer be allowed to deluge our mails with thousands of tons of trashy stuff, destructive rather than constructive in its influence, thus costing the government millions of dollars. These publications are not sent in good faith to bona fide subscribers, but to many unwilling subscribers whose names are surreptitiously obtained. It would be far better if the amount thus unwisely expended were devoted to free rural routes. The result would be the farmers would take daily papers, and tens of thousands of our home daily newspapers, with all their elevating, refining and educating influence, would find their way into rural homes. Of all men, the farmer needs the daily paper. He is enabled thereby to keep in touch with the world's advance, to be posted on current events, and to understand daily markets. Nothing,

in my judgment, gentlemen, will do more to hasten this desired end than good roads. The farmer's family must be kept in close touch and inter-communication with the world's thought and action or they will migrate from the country to the already over-crowded cities.

REPORT OF SECRETARY FOR THE YEAR 1898.

RECEIPTS.

Balance on hand.....	\$1,597 00
State of Indiana, appropriation.....	10,000 00
Railway tickets sold in 1897.....	636 75
State of Indiana, damage to grounds by soldiers....	710 75
Sale of mare.....	45 80
Rents	334 95
Privileges	2,691 35
Stall fees	890 00
Entry fees	340 00
Exhibitors' tickets	522 00
Admissions	21,125 15
J. H. Steiner, suspensions collected.....	107 45
Sale of hay.....	51 00
Loan, Franklin National Bank.....	7,764 90
	<hr/> \$46,817 10

DISBURSEMENTS

Per diem and mileage.....	\$2,845 16
Salaries, secretary, treasurer and janitor.....	2,753 80
Postage, telegrams and express.....	470 80
Printing, stationery and supplies.....	2,367 91
Advertising	2,367 52
Construction and repairs.....	8,249 60
Banking, interest and rentals.....	2,661 10
Insurance	1,353 70
Furniture and tools.....	144 70
Claims of past years.....	187 85
Expense of exhibition.....	4,315 02
Premiums	11,113 42
Expense of meeting in 1897.....	44 80
Cost and freight on mare.....	97 20
Battle of Manila	3,000 00
Entries returned	340 00
Tickets redeemed	42 80

BOARD OF AGRICULTURE.

DISBURSEMENTS—CONTINUED

Indianapolis Gas Company, contract for 1898.....	\$125 78	
Expense of meeting 1899.....	17 00	
Miscellaneous	280 17	
		<hr/>
		\$42,778 33
Balance on hand.....		<hr/>
		\$4,038 77

STATEMENT OF RECEIPTS AND EXPENSES OF FAIR.

General admission, September 13.....	\$287 50	
General admission, September 14.....	3,581 75	
General admission, September 15.....	6,483 50	
General admission, September 16.....	4,928 25	
Grand stand admissions, September 14.....	2,480 25	
Grand stand admissions, September 15.....	2,251 00	
Grand stand admissions, September 16.....	826 50	
Special admissions	286 40	
Exhibitors' tickets	522 00	
Privileges	2,691 35	
Stall rents	890 00	
		<hr/>
		\$25,228 50

EXPENSES.

Premiums	\$11,113 42	
Expense of exhibition.....	4,315 02	
Postage, telegrams and express.....	470 80	
Printing, stationery and supplies.....	2,367 91	
Advertising	2,367 52	
Battle of Manila	3,000 00	
Per diem and mileage.....	2,845 16	
Salaries	2,753 80	
		<hr/>
		\$29,233 63
Net loss on fair.....		<hr/>
		\$4,005 13

CLAIMS UNPAID.

Clemens Vonnegut, Jr.....	\$40 00	
The Up-to-date	20 00	
Franklin National Bank.....	8,000 00	
		<hr/>
		\$8,060 00

PROPERTY VALUATION.

Eighty acres and improvements	\$145,000 00
Improvements on leased land	10,000 00
Steam pump and boiler	125 00
Sprinkling wagon	100 00
Sixty-five hundred chairs	1,000 00
Furniture and fixtures	200 00
Cash on hand	4,038 77
	<hr/> \$160,463 77
Net valuation	\$152,403 77

LIST OF OUTSTANDING WARRANTS.

1893—		
No. 1346.	Reuben Bunnell	\$0 50
No. 1410.	Ida Thompson	2 50
1894—		
No. 622.	Rockville Tribune	1 25
1895—		
No. 1545.	Westfield News	1 00
No. 2326.	Indiana Paper Company	10 55
1897—		
No. 2424.	Marshall Smith	1 00
No. 2547.	Worthington Times	1 00
No. 3368.	Big Four Railway	47
No. 3577.	A. L. Preston	1 00
1898—		
No. 5071.	Dana News	1 00
No. 5200.	Princeton Clarion	1 50
No. 94.	Spiceland Creamery Company	8 08
No. 95.	Standard Advertising Company	50 00
No. 96.	Ft. Wayne Bill Posting Company	9 79
No. 97.	Seymour Democrat	2 00
No. 5298.	P. M. Purcel	20 00
No. 99.	Long, Knight Lumber Company	20 25
No. 5300.	Indianapolis News	5 00
No. 01.	Swine Breeders' Journal	15 00
No. 02.	Indiana Paper Company	8 15
No. 03.	Mrs. J. S. Neff	5 95
No. 04.	Edna Neff	20 95
No. 05.	Bertermann Floral Company	25 00
No. 06.	Knight & Jillson	202 30

No. 07.	Indianapolis Journal	107 00
No. 08.	Chas. F. Kennedy.....	75 00
No. 09.	Chas. F. Kennedy.....	10 00
No. 10.	F. C. Donald.....	17 00
No. 12.	The Indianapolis Tribune.....	25 00
No. 13.	Indianapolis Sentinel	6 00
No. 14.	Indianapolis Sun Publishing Company...	78 00
No. 16.	Lebanon Patriot	2 00
No. 17.	North Vernon Banner.....	1 50
No. 18.	Indianapolis Journal Job Printing Comp'y	12 50
No. 21.	Anderson Bulletin	3 00
No. 22.	Bloomfield Democrat	1 50
No. 23.	Beltz & Fike.....	50
No. 24.	D. M. Brown.....	16 00
No. 25.	Carmony Bros.	1 50
No. 26.	Disher and Mack.....	2 10
No. 27.	Frommeyer Bros.	1 20
No. 5328.	Fraser & McElhoe.....	1 00
No. 29.	H. J. Huder.....	4 20
No. 30.	Hetherington & Berner.....	25
No. 31.	Indiana Pigeon and Pet Stock.....	125 00
No. 32.	Indianapolis Gas Company.....	125 78
No. 33.	Muncie Street Railway.....	10 00
No. 34.	Lilly & Stalnacker.....	206 16
No. 35.	Horace Wood	18 00
No. 36.	Thorntown Enterprise	1 00
No. 37.	E. J. Robison.....	137 50
No. 38.	Chas. F. Kennedy.....	12 22
No. 39.	Robt. Zenor & Company.....	766 91
No. 40.	Wm. Rouse & Son.....	14 60
No. 41.	Ewald Over	7 50
No. 42.	Marion Gazette	6 54
No. 43.	Central Union Telephone Company.....	99 20
No. 44.	American Express Company.....	2 69
No. 45.	Adams Express Company.....	3 05
		<hr/> \$2,315 61

TREASURER'S REPORT FOR YEAR 1898.

RECEIPTS.

Jan. 1.	Balance	\$1,982 15
Jan. 4.	I. D. & W. coupons.....	636 75
Apr. 4.	State appropriation	10,000 00
May 19.	Blair & Baker.....	45 80
July 9.	.....	710 75
Sept. 12.	H. L. Nowlin (privileges).....	805 98
" 13.	H. L. Nowlin (privileges).....	640 00
" 13.	Chas. F. Kennedy (entries, etc.).....	1,456 30
" 13.	Sale of tickets.....	287 50
" 14.	H. L. Nowlin (privileges).....	436 00
" 14.	Sale of tickets.....	6,062 00
" 15.	H. L. Nowlin (privileges).....	452 00
" 15.	Sale of tickets.....	8,734 50
" 16.	H. L. Nowlin (privileges).....	145 00
" 16.	Sale of tickets.....	5,754 75
" 17.	H. L. Nowlin (privileges).....	152 37
Oct. 7.	Bank	969 30
" 14.	Bank	969 80
" 22.	Bank	5,825 80
Dec. 31.	J. H. Steiner (protest fees).....	107 45
" 31.	C. F. Kennedy (entries, etc.).....	620 34
" 31.	C. F. Kennedy (entries, etc.).....	331 71
" 31.	C. F. Kennedy, hay.....	51 00
		<hr/> \$47,177 25

DISBURSEMENTS.

Dec. 31.	Warrants paid	\$40,822 87
" 31.	Warrants outstanding	2,315 61
	Balance on hand.....	4,038 77
		<hr/> \$47,177 25

Respectfully submitted,

E. J. ROBISON, Treasurer.

Both reports were read by Mr. Kennedy, and were then referred to the Auditing Committee.

Reports of General and Department Superintendents:

Report by Mr. Thompson read. The other reports referred to the Auditing Committee without reading.

REPORT OF GENERAL SUPERINTENDENT OF GROUNDS.

To the President and Delegate State Board of Agriculture:

Gentlemen—The undersigned begs leave to submit as his report, as General Superintendent, the following recommendations:

I recommend the replatting of that part of the grounds used for privileges and exhibits, by which means the space suitable for cash-paying privileges can be increased so that the additional money derived therefrom for the first Fair will cover the cost of platting.

I would further recommend that the central and most used part of the grounds be leveled, graded, and a system of surface drainage provided that will take care of our annual down-pour Fair week; also that there be gravel walks or roadways built, so that all exhibits and privileges will front thereon.

I strongly advise that the basement of the grandstand be fitted up so as to be used for first-class privileges, believing that the first year's receipts therefrom will cover all the costs of this improvement.

Giving President Downing credit for the inspiration, I would advise that the amphitheaters connected with the old horse and cattle show-rings be moved to a point west of the grandstand, and overlooking the race-course, believing that the cost of moving these buildings (which ought not to exceed \$150) will be returned during the week of the first Fair by sale of seats therein. Besides, the rear of said buildings can be used for cash-paying privileges.

I herewith submit the following as a careful, and, as I believe, a fair estimate of the damage to grounds and buildings on account of the occupancy of same by the Indiana National Guard and afterward by the federal troops camped therein while being mustered in and out of service as soldiers in the war with Spain:

Statement of Damage to Buildings and Grounds of the Indiana State Board of Agriculture on Account of the Occupancy of the Same by the Indiana National Guard and the Volunteers Assembled Under the Call of the President of the United States, Said Period of Occupancy Dating from the 26th day of April Until the Mustering Out of Troops on the Grounds, November 1, 1898:

ART BUILDING.

Repairs made prior to Fair, September 12, 1898—

Labor and material	\$100 00	
Damage to building, furniture and fixtures not repaired, including damage to flags, showcases, bunting and other decorations, plumbing, lavatories, booths, partitions, floors, inside walls, outside walls, doors, glass, paint, etc.	400 00	\$500 00

AGRICULTURAL BUILDING.

Repairs made prior to Fair, September 12—	
Labor	\$50 00
Material—lumber, nails and locks.....	120 00
Damage to building and fixtures, not repaired, including damage to 500 glass, grain and seed exhibit urns, pavilion, platform, shelving, floors, electric wiring, walls, doors, outside walls, glass and paint.	200 00
	<hr/>
	370 00

HORTICULTURAL BUILDING.

Repairs made prior to date of Fair, September 12—	
Labor	\$21 00
Material	65 00
45 loads of dirt, at 50 cents.....	22 50
Damage to building and fittings, including damage to shelving, tables, electric wiring, plumbing, offices, floors, walls, glass, sash, outside walls, doors, paint, etc.	175 00
	<hr/>
	302 50

POULTRY BUILDING.

Repairs made prior to Fair, September 12—	
Labor	\$21 00
Material	28 00
Damage to building, including damage to coops, shelving, electric wiring, walls, plumbing, outside walls, glass, sash, doors, paint, etc.....	75 00
	<hr/>
	124 00

DAIRY BUILDING.

Repairs to building prior to Fair, September 12—	
Labor and material	\$60 00
Damage to building, including damage to cooler, plumbing, shelving, floors, walls, outside walls, glass, doors, paint, platforms, etc.....	90 00
	<hr/>
	150 00

SHEEP BARN.

Repairs made prior to September 12—	
Labor	\$110 00
Material	100 00
50 loads of dirt, at 50 cents.....	25 00

Damages to building, including damages to pens, doors, platforms, troughs, floors, sinks, offices, walls, outside walls, roof, paint (two coats), etc.....	750 00	
		985 00

TEN CATTLE BARNS.

Repairs made prior to Fair, September 12—		
Labor on 10 barns	\$250 00	
Material on 10 barns	100 00	
100 loads of dirt, at 40 cents	40 00	
Damages to buildings and fittings, all damages estimated on the 10 barns, including damages to floors, main doors, stalls, fly-doors, troughs, roof, outside walls, paint (two coats), etc.....	1,360 00	
		1,750 00

EIGHT HORSE BARNS.

Repairs made prior to Fair, September 12—		
100 loads of dirt, at 40 cents.....	\$64 00	
Cleaning 8 barns	60 00	
Labor	50 00	
Material	50 00	
Damages not repaired—		
Floors and cleaning windows.....	200 00	
Sash and glass	250 00	
Stalls and stall doors	40 00	
Siding	50 00	
Painting fronts	150 00	
		914 00

SWINE BARNS, EIGHT SECTIONS.

Repairs made prior to Fair, September 12—		
Labor	\$20 00	
Material	20 00	
Damages not repaired	25 00	
		65 00

GRANDSTAND AND FIXTURES.

Damages not repaired, including damage to chairs, floors, railings, boxes, plumbing, paint, etc.....	200 00
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TWELVE SPEED BARNS.

Repairs made prior to Fair, September 12.....	\$50 00	
Damages not repaired	50 00	
		100 00

ADMINISTRATION BUILDING AND FIXTURES.

Including damages to carpets, matting, chairs, lounges, counters, tables, railings, side walls, ceilings, electric wiring, plumbing, cleaning, glass, sash, paint, etc.	\$250 00	
		250 00

MAIN ENTRANCE, SOUTH GATE.

Damages to doors, windows, floors, paint, etc.		75 00
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EAST ENTRANCE.

Damages to gates, doors, windows, paint, etc.		50 00
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STREET CAR ENTRANCE.

Damages to gates, ticket office, paint and fences.		150 00
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ENCLOSURE.

Damages to gates, picket and wire fences.		100 00
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TRACK FENCE.

Total destruction of inside fence and damage to outside fence		500 00
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SEVEN WATER CLOSETS.

Repairs made prior to Fair, September 12—		
Cleaning vaults	\$95 00	
Whitewashing	30 00	
Cleaning vaults	100 00	
Cleaning, whitewashing, repairing and plumbing...	75 00	
		300 00

SHADE TREES.

30 trees, five years' growth, at \$10 each.		300 00
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MISCELLANEOUS.

Filling pits, trenches, leveling grounds where tents were struck, and damage to grass.		1,000 00
Cleaning grounds for Fair, September 12.		350 00
Cleaning rubbish off grounds since Fair.		300 00

Lumber used by soldiers, 5,000 feet at \$20.....	100 00
Damage to water system	100 00

Grand total	\$9,037 50
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Respectfully submitted,

JOHN L. THOMPSON.

General Superintendent.

REPORT OF SUPERINTENDENT OF SPEED DEPARTMENT.

To the Delegate State Board of Agriculture:

Gentlemen—The continuous rain during the week of the Fair, which prevented the starting of any one of the races scheduled for the Fair, compels this report to be very brief and without great value. The list of entries contained many of the best stables and best horses now on the trotting and pacing courses, and we therefore congratulate ourselves on the work accomplished so far as it was possible for us to pursue it. Encountering a week so constantly rainy that at no time during the week were the judges called to the stand for the purpose of starting the races, is an experience unexpected and almost unparalleled.

The new judges' and timers' stand is a model of neatness, and perfectly adapted to the uses of the race-course. The assembling of the judges and timers under the same roof, yet completely separated, will prove a decided and valuable improvement. Having the old starters' stand removed from the outside of the track will be appreciated by the spectators and especially those who are intensely interested in the finishes of the heats. The cost of the department consists of the expense of having in readiness the track officials until the time that the races were declared off by the Board. The total expense was \$182.50.

Respectfully submitted,

M. S. CLAYPOOL,

Superintendent.

REPORT OF SUPERINTENDENT OF HORSES.

To the Delegate State Board of Agriculture:

Gentlemen—Your Superintendent of Heavy Draft, Coach and Light Harness Coach and Carriage Teams, Ponies, Saddlers and Equipages submits the following:

The number of entries in some of the above exhibits was not up to

my expectation. The animals on exhibition were, with a few exceptions, of a very fine quality. The following judges were used: Mr. Cicero Vance, of Rushville, judged the light harness horses, and gave general satisfaction; expense of judging the light harness horses, \$16.20. Expense of A. W. Powell for judging heavy horses—who is an excellent judge—was \$16.30. Expense of D. P. Shawhan, Assistant Superintendent, \$21. Other expenses of department, \$24.

The awards in this department were as follows:

CLASS I—French Draft and Percheron Horses.

(A. W. Powell, Judge.)

STALLIONS.

4 years old and over, Robert Burgess & Son, Wenona Ill.....	\$20 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	12 00
3 to 4 years old, Robert Burgess & Son, Wenona, Ill.....	15 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	10 00
Third premium, Robert Burgess & Son, Wenona, Ill.....	6 00
2 to 3 years old, Robert Burgess & Son, Wenona, Ill.....	12 00
Second premium, J. Crouch & Son, Lafayette, Ind.....	8 00
Third premium, Robert Burgess & Son, Wenona, Ill.....	5 00
1 to 2 years old, Robert Burgess & Son, Wenona, Ill.....	10 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	6 00
Colt, Robert Burgess & Son, Wenona, Ill.....	8 00

MARES.

4 years old or over, Robert Burgess & Son, Wenona, Ill.....	20 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	12 00
3 to 4 years old Robert Burgess & Son, Wenona, Ill.....	15 00
Stallion and 4 colts, Robert Burgess & Son, Wenona, Ill.....	20 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	15 00

CLASS II—Clydesdale and English Shires.

(A. W. Powell, Judge.)

STALLIONS.

4 years old or over, Robert Burgess & Son, Wenona, Ill.....	\$20 00
3 to 4 years old, Robert Burgess & Son, Wenona, Ill.....	15 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	10 00
2 to 3 years old, Robert Burgess & Son, Wenona, Ill.....	12 00

Second premium, Robert Burgess & Son, Wenona, Ill.....	8 00
1 to 2 years old, Robert Burgess & Son, Wenona, Ill.....	10 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	6 00

MARES.

3 to 4 years old, Robert Burgess & Son, Wenona, Ill.....	15 00
2 to 3 years old, Robert Burgess & Son, Wenona, Ill.....	12 00
1 to 2 years old Robert Burgess & Son, Wenona, Ill.....	10 00
Colt, Robert Burgess & Son, Wenona, Ill.....	8 00
Stallion and 4 colts, Robert Burgess & Son, Wenona, Ill.....	20 00

CLASS III—French and German Coach.

(A. W. Powell, Judge.)

STALLIONS.

4 years old or over, Lafayette Importing Co., Lafayette, Ind.....	\$20 00
Second premium, J. Crouch & Son, Lafayette, Ind.....	12 00
Third premium, J. Crouch & Son, Lafayette, Ind.....	7 00
3 to 4 years old, J. Crouch & Son, Lafayette, Ind.....	15 00
Second premium, J. Crouch & Son, Lafayette, Ind.....	10 00
Third premium, J. Crouch & Son, Lafayette, Ind.....	6 00
2 to 3 years old, J. Crouch & Son, Lafayette, Ind.....	12 00
2 to 3 years old, J. Crouch & Son, Lafayette, Ind.....	10 00

MARES.

4 years old or over, J. Crouch & Son, Lafayette, Ind.....	20 00
Second premium, J. Crouch & Son, Lafayette, Ind.....	12 00

CLASS IV—Cleveland Bay, Hackney and American Coach.

(A. W. Powell, Judge.)

STALLIONS.

4 years old or over, J. Crouch & Son, Lafayette, Ind.....	\$20 00
Second premium, Robert Burgess & Son, Wenona, Ill.....	12 00
Third premium, A. G. Hypes, North Salem, Ind.....	7 00
3 to 4 years old, Ira S. Dogget, Downeyville, Ind.....	15 00
2 to 3 years old, Robert Burgess & Son, Wenona, Ill.....	12 00
1 to 2 years old, J. R. Peak & Son, Winchester, Ill.....	10 00
Second premium, Ira S. Dogget, Downeyville, Ind.....	6 00
Colt, Robert Burgess & Son, Wenona, Ill.....	8 00

MARES.

4 years old and over, A. C. Turner, Ross, O.....	20 00
Second premium, J. R. Peak & Son, Winchester, Ill.....	12 00
Third premium, A. C. Turner, Ross, O.....	7 00
3 to 4 years old, J. R. Peak & Son, Winchester, Ill.....	15 00
Second premium, A. C. Turner, Ross, O.....	10 00
Third premium, H. F. Morgan, Indianapolis, Ind.....	6 00
2 to 3 years old, John W. Fort, Indianapolis, Ind.....	12 00
1 to 2 years old, Wm. Furry & Sons, New Palestine, Ind.....	10 00
Second premium, H. F. Morgan, Indianapolis, Ind.....	6 00
Colt, Robert Burgess & Son, Wenona, Ill.....	8 00
Stallion and 4 colts, Robert Burgess & Son, Wenona, Ill.....	20 00
Second premium, J. R. Peak & Son, Winchester, Ill.....	15 00

CLASS V—Light Harness.

(C. F. Vance, Judge.)

STALLIONS.

4 years old or over, J. R. Peak & Son, Winchester, Ill.....	\$20 00
Second premium, A. C. Turner, Ross, O.....	12 00
Third premium, L. M. Hubbell, Indianapolis, Ind.....	7 00
2 to 3 years old, H. W. Streeter, Greenfield, Ind.....	12 00
Second premium, Ira S. Dogget, Downeyville, Ind.....	8 00
Third premium, H. F. Morgan, Indianapolis, Ind.....	5 00
1 to 2 years old, Wm. Dagler, Rushville, Ind.....	10 00
Second premium, J. B. Clawson, Indianapolis, Ind.....	6 00
Colt, H. B. Howland, Howland, Ind.....	8 00
Second premium, J. R. Peak & Son, Winchester, Ill.....	5 00

MARES.

4 years old or over, J. R. Peak & Son, Winchester, Ill.....	20 00
Second premium, Frank Young, Club Stables, Indianapolis, Ind...	12 00
Third premium, A. C. Turner, Ross, O.....	7 00
3 to 4 years old, A. C. Turner, Ross, O.....	15 00
Second premium, Wm. Dagler, Rushville, Ind.....	10 00
Third premium, John W. Fort, Indianapolis, Ind.....	6 00
2 to 3 years old, Wm. Dagler, Rushville, Ind.....	12 00
Second premium, H. F. Morgan, Indianapolis, Ind.....	8 00
1 to 2 years old, J. R. Peak & Son, Winchester, Ill.....	10 00
Second premium, H. B. Howland, Howland, Ind.....	6 00
Third premium, Wm. Dagler, Rushville, Ind.....	4 00

GELDINGS.

4 years old or over, W. W. Baker, Indianapolis, Ind.....	20 00
Second premium, O. B. Blair, Indianapolis, Ind.....	12 00
Third premium, J. R. Peak & Son, Winchester, Ill.....	7 00
3 to 4 years old, Wm. Dagler, Rushville, Ind.....	15 00
Second premium, H. F. Morgan, Indianapolis, Ind.....	10 00
2 to 3 years old, Manker & Bro., Indianapolis, Ind.....	12 00
Second premium, H. E. Sebern, Indianapolis, Ind.....	8 00
Third premium, H. B. Howland, Howland, Ind.....	5 00
Stallion and 4 colts. Wm. Dagler, Rushville, Ind.....	20 00
Second premium, J. R. Peak & Son, Winchester, Ill.....	15 00

CLASS VI—Roadsters and Saddlers.

(C. F. Vance, Judge.)

SADDLERS AND ROADSTERS.

Coach or carriage team, Robert Burgess & Son, Wenona, Ill.....	\$30 00
Second premium, J. F. Burt, Indianapolis, Ind.....	20 00
Third premium, J. R. Peak & Son, Winchester, Ill.....	10 00
Roadster, mare, J. R. Peak & Son, Winchester, Ill.....	30 00
Second premium, T. J. Southern, Indianapolis, Ind.....	20 00
Third premium, Monroe & Co., New Castle, Ind.....	10 00
Roadster, gelding, W. W. Baker, Indianapolis, Ind.....	30 00
Second premium, O. B. Blair, Indianapolis, Ind.....	20 00
Third premium, J. R. Peak & Son, Winchester, Ill.....	10 00
Double roadster, J. R. Peak & Son, Winchester, Ill.....	30 00
Second premium, J. F. Burt, Indianapolis, Ind.....	20 00
Third premium, A. C. Turner, Ross, O.....	10 00
Saddle stallion, John V. Connolly, Madison, Ind.....	30 00
Second premium, Cy. S. Tandy, Milton, Ky.....	20 00
Saddle mare, Henry Taylor, Richmond, Ind.....	30 00
Second premium, John V. Connolly, Madison, Ind.....	20 00
Third premium, Geo. A. Scott, Russellville, Ind.....	10 00
Saddle gelding, W. M. McIntire, Greenville, Ind.....	30 00
Second premium, Ben Vestal, Plainfield, Ind.....	20 00
Third premium, H. W. Streeter, Greenfield, Ind.....	10 00
Sadler, John V. Connolly, Madison, Ind.....	50 00

CLASS VII—Ponies.

(C. F. Vance, Judge.)

PONIES.

Pony, 11 hands, Clint Hare, Indianapolis, Ind.....	\$10 00
Second premium, O. B. Blair, Indianapolis, Ind.....	5 00

Pony, 11 to 13 hands, Chester Baker, Indianapolis, Ind.	10 00
Second premium, Hilda Fletcher, Indianapolis, Ind.	5 00
Mare or colt, W. J. Hasselman, Indianapolis, Ind.	10 00
Second premium, W. J. Hasselman, Indianapolis, Ind.	5 00

CLASS VIII—Equipages.

(C. F. Vance, Judge.)

EQUIPAGES.

Two horses, two seated, J. F. Burt, Indianapolis, Ind.	\$20 00
Second premium, Robert Burgess & Son, Wenona, Ill.	15 00
One horse, one seated for lady, W. W. Baker, Indianapolis, Ind. ...	15 00
Vehicle for children, Wm. J. Gileny, Indianapolis, Ind.	15 00
Second premium, Clint Hare, Indianapolis, Ind.	12 00

Respectfully submitted,

JOHN C. HAINES.

Superintendent.

REPORT OF SUPERINTENDENT OF CATTLE.

The untimely death of our esteemed coworker, Hon. Claude Matthews, made it necessary that a Superintendent of Beef Cattle should be appointed, and I assumed this duty in connection with that of Superintendent of Dairy Cattle and Dairy Products. The details necessary to a successful exhibition of beef cattle were so nearly completed by Mr. Matthews that I but had to carry out his plans, so far as they could be determined, to insure a successful show. It was thought advisable to select a man to judge the "battle of the breeds" who was not only fully qualified as judge of all cattle for beef, but who could or would not be especially identified with any one of the competing breeds; and in the selection of Mr. J. G. Imboden, of Decatur, Ill., this standard of impartiality was maintained. The contest was an interesting one and the verdict of the judge was approved. This feature of the cattle exhibit should be maintained, and I therefore recommend that this be done. The entries in the various classes were as follows:

Shorthorns and Polled Durhams.	67
Herefords	89
Aberdeen-Angus	44
Galloways	60
Red Polls	21
Devon	21
Battle of the Breeds (herds).....	11
Sweepstakes bull	13
Sweepstakes cow or helper.....	13

DAIRY BREEDS.

The exhibit of dairy cattle was of unusual merit and equal in numbers to former shows. This is especially applicable to the Herefords. Mr. M. A. Scoville, of Lexington, Ky., served as judge of dairy cattle, and was approved by the impartial critics. The entries by classes were as follows:

Jerseys	63
Holstein-Fresian and Dutch Belted.....	112
Ayrshires	40
Guernseys	42

The following are the awards:

CLASS IX—Shorthorns.

(E. H. Pickrell, Judge.)

BULLS.

3 years old or over, G. E. Ward, Hawarden, Ia.....	\$15 00
Second premium, Aaron Barber, Avon, N. Y.....	10 00
Third premium, J. D. Douglas & Son, Sulphur Hill, Ind.....	5 00
2 to 3 years old, G. E. Ward, Hawarden, Ia.....	10 00
Second premium, John W. Harper, LaFountain, Ind.....	7 00
1 to 2 years old, J. D. Douglas & Son, Sulphur Hill, Ind.....	8 00
Calf, Aaron Barber, Avon, N. Y.....	5 00
Second premium, J. D. Douglas & Son, Sulphur Hill, Ind.....	3 00
Third premium, G. E. Ward, Hawarden, Ia.....	2 00

COWS AND HEIFERS.

3 years old or over, Aaron Barber, Avon, N. Y.....	15 00
Second premium, G. E. Ward, Hawarden, Ia.....	10 00
Third premium, Aaron Barber, Avon, N. Y.....	5 00
2 to 3 years old, Aaron Barber, Avon, N. Y.....	10 00
Second premium, J. D. Douglas & Son, Sulphur Hill, Ind.....	7 00
Third premium, Aaron Barber, Avon, N. Y.....	4 00
1 to 2 years old, G. E. Ward, Hawarden, Ia.....	8 00
Second premium, G. E. Ward, Hawarden, Ia.....	6 00
Third premium, Aaron Barber, Avon, N. Y.....	3 00
Calf, Aaron Barber, Avon, N. Y.....	5 00
Second premium, Aaron Barber, Avon, N. Y.....	3 00
Third premium, J. D. Douglas & Son, Sulphur Hill, Ind.....	2 00
Four animals, get of one sire, Aaron Barber, Avon, N. Y.....	10 00
Second premium, Aaron Barber, Avon, N. Y.....	7 00

Third premium, G. E. Ward, Hawarden, Ia.....	4 00
Two animals, produce of one cow, Aaron Barber, Avon, N. Y.....	10 00
Second premium, G. E. Ward, Hawarden, Ia.....	7 00
Third premium, Aaron Barber, Avon, N. Y.....	4 00
Exhibitor's herd, Aaron Barber, Avon, N. Y.....	20 00
Second premium, G. E. Ward, Hawarden, Ia.....	10 00
Breeder's herds, Aaron Barber, Avon, N. Y.....	20 00
Bull, G. E. Ward, Hawarden, Ia.....	20 00
Cow or helper, Aaron Barber, Avon, N. Y.....	20 00

CLASS X—Herefords.

(James D. Williams, Judge.)

BULLS.

3 years old or over, W. H. Curtice, Eminence, Ky.....	\$15 00
Second premium, Clem Graves, Bunker Hill, Ind.....	10 00
2 to 3 years old, F. A. Nave, Attica, Ind.....	10 00
Second premium, Thos. Clark, Beecher, Ill.....	7 00
1 to 2 years old, Clem Graves, Bunker Hill, Ind.....	8 00
Second premium, Thos. Clark, Beecher, Ill.....	6 00
Calf, F. A. Nave, Attica, Ind.....	5 00
Second premium, Clem Graves, Bunker Hill, Ind.....	3 00
Third premium, Thos. Clark, Beecher, Ill.....	2 00

COWS AND HEIFERS.

3 years old or over, F. A. Nave, Attica, Ind.....	15 00
Second premium, F. A. Nave, Attica, Ind.....	10 00
Third premium, John Hooker, New London, Ind.....	5 00
2 to 3 years old, F. A. Nave, Attica, Ind.....	10 00
Second premium, John Hooker, New London, Ind.....	7 00
Third premium, Thos. Clark, Beecher, Ill.....	4 00
1 to 2 years old, Thos. Clark, Beecher, Ill.....	8 00
Second premium, Thos. Clark, Beecher, Ill.....	6 00
Third premium, Thos. Clark, Beecher, Ill.....	3 00
Calf, Thos. Clark, Beecher, Ill.....	5 00
Second premium, Thos. Clark, Beecher, Ill.....	3 00
Third premium, F. A. Nave, Attica, Ind.....	2 00
Four animals, get of one sire, Thos. Clark, Beecher, Ill.....	10 00
Second premium, Thos. Clark, Beecher, Ill.....	7 00
Third premium, Clem Graves, Bunker Hill, Ind.....	4 00
Two animals, get of one cow, F. A. Nave, Attica, Ind.....	10 00
Second premium, Thos. Clark, Beecher, Ill.....	7 00

Third premium, Thos. Clark, Beecher, Ill.....	4 00
Exhibitor's herd, F. A. Nave, Attica, Ind.....	20 00
Second premium, Thos. Clark, Beecher, Ill.....	10 00
Breeder's herd, Thos. Clark, Beecher, Ill.....	20 00
Second premium, Clem Graves, Bunker Hill, Ind.....	10 00

SWEEPSTAKES.

Bull, F. A. Nave, Attica, Ind.....	20 00
Cow or heifer, Thos. Clark, Beecher, Ill.....	20 00

CLASS XI—Aberdeen-Angus.

(J. H. Pickrell, Judge.)

BULLS.

3 years old or over, D. Bradfute & Son, Cedarville, O.....	\$15 00
Second premium, Henderson & Sons, Lebanon, Ind.....	10 00
Third premium, W. R. Risher, Brazil, Ind.....	5 00
1 to 2 years old, D. Bradfute & Son, Cedarville, O.....	8 00
Calf, W. R. Risher, Brazil, Ind.....	5 00
Second premium, D. Bradfute & Son, Cedarville, O.....	3 00
Third premium, Henderson & Sons, Lebanon, Ind.....	2 00

COWS AND HEIFERS.

3 years old or over, D. Bradfute & Son, Cedarville, O.....	15 00
Second premium, D. Bradfute & Son, Cedarville, O.....	10 00
Third premium, W. R. Risher, Brazil, Ind.....	5 00
2 to 3 years old, D. Bradfute & Son, Cedarville, O.....	10 00
Second premium, D. Bradfute & Son, Cedarville, O.....	7 00
Third premium, W. R. Risher, Brazil, Ind.....	4 00
1 to 2 years old, D. Bradfute & Son, Cedarville, O.....	8 00
Second premium, D. Bradfute & Son, Cedarville, O.....	6 00
Third premium, W. R. Risher, Brazil, Ind.....	3 00
Calf, D. Bradfute & Son, Cedarville, O.....	5 00
Second premium, D. Bradfute & Son, Cedarville, O.....	3 00
Third premium, W. R. Risher, Brazil, Ind.....	2 00
Four animals, get of one bull, D. Bradfute & Son, Cedarville, O...	10 00
Second premium, D. Bradfute & Son, Cedarville, O.....	7 00
Two animals, produce of one cow, D. Bradfute & Son, Cedarville, O.	10 00
Second premium, D. Bradfute & Son, Cedarville, O.....	7 00
Third premium, W. R. Risher, Brazil, Ind.....	4 00
Exhibitor's herd, D. Bradfute & Son, Cedarville, O.....	20 00
Second premium, W. R. Risher, Brazil, Ind.....	10 00
Breeder's herd, D. Bradfute & Son, Cedarville, O.....	20 00

SWEEPSTAKES.

Bull, D. Bradfute & Son, Cedarville, O.....	20 00
Cow or heifer, D. Bradfute & Son, Cedarville, O.....	20 00

CLASS XII—Galloways.

(James D. Williams, Judge.)

BULLS.

3 years old or over, G. W. Gilburn, Winchester, Ind.....	\$15 00
Second premium, Hess & Co., Martinsville, Ind.....	10 00
Third premium, Almond Chapman, Rockwood, Mich.....	5 00
2 to 3 years old, Marion Parr, Champaign, Ill.....	10 00
1 to 2 years old, Almond Chapman, Rockwood, Mich.....	8 00
Second premium, T. J. Davis & Son, Triumph, Ill.....	6 00
Third premium, Marion Parr, Champaign, Ill.....	3 00
Calf, Marion Parr, Champaign, Ill.....	5 00
Second premium, T. J. Davis & Son, Triumph, Ill.....	3 00
Third premium, Marion Parr, Champaign, Ill.....	2 00

COWS AND HEIFERS.

3 years old or over, Marion Parr, Champaign, Ill.....	15 00
Second premium, T. J. Davis & Son, Triumph, Ill.....	10 00
Third premium, Marion Parr, Champaign, Ill.....	5 00
2 to 3 years old, Marion Parr, Champaign, Ill.....	10 00
Second premium, Almond Chapman, Rockwood, Mich.....	7 00
Third premium, T. J. Davis & Son, Triumph, Ill.....	4 00
1 to 2 years old, Marion Parr, Champaign, Ill.....	8 00
Second premium, Almond Chapman, Rockwood, Mich.....	6 00
Third premium, T. J. Davis & Son, Triumph, Ill.....	3 00
Calf, T. J. Davis & Son, Triumph, Ill.....	5 00
Second premium, T. J. Davis & Son, Triumph, Ill.....	3 00
Third premium, Almond Chapman, Rockwood, Mich.....	2 00
Four animals, get of one sire, Marion Parr, Champaign, Ill.....	10 00
Second premium, Almond Chapman, Rockwood, Mich.....	7 00
Third premium, T. J. Davis & Son, Triumph, Ill.....	4 00
Two animals, produce of one cow, Marion Parr, Champaign, Ill...	10 00
Second premium, T. J. Davis & Son, Triumph, Ill.....	7 00
Third premium, Almond Chapman, Rockwood, Mich.....	4 00
Exhibitor's herd, Marion Parr, Champaign, Ill.....	20 00
Second premium, T. J. Davis & Son, Triumph, Ill.....	10 00
Breeder's herd, T. J. Davis & Son, Triumph, Ill.....	20 00

SWEEPSTAKES.

Bull, G. W. Gilburn, Winchester, Ind.....	20 00
Cow or heifer, Marlon Parr, Campaign, Ill.....	20 00

CLASS XIII—Red Polls.

(James D. Williams, Judge.)

BULLS.

3 years old or over, Andrew & Bro., Cedarville, O.....	\$10 00
2 to 3 years old, Andrew & Bro., Cedarville, O.....	7 00
1 to 2 years old, Andrew & Bro., Cedarville, O.....	5 00
Calf, Andrew & Bro., Cedarville, O.....	5 00

COWS AND HEIFERS.

3 years old or over, Andrew & Bro., Cedarville, O.....	10 00
Second premium, Andrew & Bro., Cedarville, O.....	5 00
2 to 3 years old, Andrew & Bro., Cedarville, O.....	7 00
Second premium, Andrew & Bro., Cedarville, O.....	4 00
1 to 2 years old, Andrew & Bro., Cedarville, O.....	5 00
Second premium, Andrew & Bro., Cedarville, O.....	3 00
Calf, Andrew & Bro., Cedarville, O.....	5 00
Second premium, Andrew & Bro., Cedarville, O.....	3 00
Four animals, get of one sire, Andrew & Bro., Cedarville, O.....	8 00
Second premium, Andrew & Bro., Cedarville, O.....	4 00
Two animals, produce of one cow, Andrew & Bro., Cedarville, O...	8 00
Second premium, Andrew & Bro., Cedarville, O.....	4 00
Exhibitor's herd, Andrew & Bro., Cedarville, O.....	10 00
Second premium, Andrew & Bro., Cedarville, O.....	5 00
Breeder's herd, Andrew & Bro., Cedarville, O.....	10 00

SWEEPSTAKES.

Bull, Andrew & Bro., Cedarville, O.....	10 00
Cow or heifer, Andrew & Bro., Cedarville, O.....	10 00

CLASS XIV—Devon.

(James D. Williams, Judge.)

BULLS.

3 years old or over, W. E. Lewis, Casstown, O.....	\$10 00
2 to 3 years old, W. E. Lewis, Casstown, O.....	7 00
1 to 2 years old, W. E. Lewis, Casstown, O.....	5 00

Calf, W. E. Lewis, Casstown, O.....	5 00
Second premium, W. E. Lewis, Casstown, O.....	3 00

COWS AND HEIFERS.

3 years old or over, W. E. Lewis, Casstown, O.....	10 00
Second premium, W. E. Lewis, Casstown, O.....	5 00
2 to 3 years old, W. E. Lewis, Casstown, O.....	7 00
Second premium, W. E. Lewis, Casstown, O.....	4 00
1 to 2 years old, W. E. Lewis, Casstown, O.....	5 00
Second premium, W. E. Lewis, Casstown, O.....	3 00
Calf, W. E. Lewis, Casstown, O.....	5 00
Second premium, W. E. Lewis, Casstown, O.....	3 00
Exhibitor's herd, W. E. Lewis, Casstown, O.....	10 00
Second premium, W. E. Lewis, Casstown, O.....	5 00
Breeder's herd, W. E. Lewis, Casstown, O.....	10 00

SWEEPSTAKES.

Bulls, W. E. Lewis, Casstown, O.....	10 00
Cows or heifers, W. E. Lewis, Casstown, O.....	10 00

CLASS XV—Sweepstakes.

(J. G. Imboden, Judge.)

Exhibitor's herd, F. A. Nave, Attica, Ind.....	\$250 00
Second premium, Aaron Barber, Avon, N. Y.....	150 00
Third premium, D. Bradfute & Son, Cedarville, O.....	100 00
Bull, F. A. Nave, Attica, Ind.....	50 00
Cow or heifer, Aaron Barber, Avon, N. Y.....	50 00

CLASS XVI—Jerseys.

(M. A. Scovell, Judge.)

BULLS.

3 years old or over, J. E. Robbins, Jr., Greensburg, Ind.....	\$15 00
Second premium, J. E. Robbins, Jr., Greensburg, Ind.....	10 00
Third premium, H. G. Hallock, Columbus, O.....	5 00
2 to 3 years old, H. G. Hallock, Columbus, O.....	10 00
Second premium, Peter Raab, Brightwood, Ind.....	7 00
Third premium, Peter Raab, Brightwood, Ind.....	4 00
1 to 2 years old, H. G. Hallock, Columbus, O.....	8 00
Second premium, J. E. Robbins, Jr., Greensburg, Ind.....	6 00

Third premium, H. G. Hallock, Columbus, O.....	3 00
Calf, J. E. Robbins, Jr., Greensburg, Ind.....	5 00
Second premium, H. G. Hallock, Columbus, O.....	3 00
Third premium, Peter Raab, Brightwood, Ind.....	2 00

COWS AND HEIFERS.

3 years old or over, J. E. Robbins, Jr., Greensburg, Ind.....	15 00
Second premium, J. E. Robbins, Jr., Greensburg, Ind.....	10 00
Third premium, J. E. Robbins, Jr., Greensburg, Ind.....	5 00
2 to 3 years old, J. E. Robbins, Jr., Greensburg, Ind.....	10 00
Second premium, H. G. Hallock, Columbus, O.....	7 00
1 to 2 years old, H. G. Hallock, Columbus, O.....	8 00
Second premium, J. E. Robbins, Jr., Greensburg, Ind.....	6 00
Third premium, Peter Raab, Brightwood, Ind.....	3 00
Calf, J. E. Robbins, Jr., Greensburg, Ind.....	5 00
Second premium, J. E. Robbins, Jr., Greensburg, Ind.....	3 00
Third premium, J. E. Robbins, Jr., Greensburg, Ind.....	2 00
Four animals, get of one sire, J. E. Robbins, Jr., Greensburg, Ind.	10 00
Second premium, H. G. Hallock, Columbus, O.....	7 00
Third premium, Peter Raab, Brightwood, Ind.....	4 00
Two animals, produce of one cow, H. G. Hallock, Columbus, O....	10 00
Second premium, J. E. Robbins, Jr., Greensburg, Ind.....	7 00
Third premium, J. E. Robbins, Jr., Greensburg, Ind.....	4 00
Exhibitor's herd, J. E. Robbins, Jr., Greensburg, Ind.....	20 00
Second premium, H. G. Hallock, Columbus, O.....	10 00
Breeder's herd, J. E. Robbins, Jr., Greensburg, Ind.....	20 00
Second premium, H. G. Hallock, Columbus, O.....	10 00

SWEEPSTAKES.

Bull, J. E. Robbins, Jr., Greensburg, Ind.....	20 00
Cow or heifer, J. E. Robbins, Jr., Greensburg, Ind.....	20 00

CLASS XVII—Holstein-Friesian and Dutch Belted.

(M. A. Scovell, Judge.)

BULLS.

3 years old or over, Henry Stevens & Son, Lacona, N. Y.....	\$15 00
Second premium, J. E. Goddard & Biedler, Willoughby, O.....	10 00
Third premium, W. H. LaGrange & Son, Franklin, Ind.....	5 00
2 to 3 years old, J. E. Goddard & Biedler, Willoughby, O.....	10 00
Second premium, Henry Stevens & Son, Lacona, N. Y.....	7 00
Third premium, A. C. Green & Son, Winchester, Ind.....	4 00

1 to 2 years old, Henry Stevens & Son, Lacona, N. Y.....	8 00
Second premium, W. H. LaGrange & Son, Franklin, Ind.....	6 00
Third premium, J. E. Goddard & Biedler, Willoughby, O.....	3 00
Calf, Henry Stevens & Son, Lacona, N. Y.....	5 00
Second premium, Henry Stevens & Son, Lacona, N. Y.....	3 00
Third premium, Henry Stevens & Son, Lacona, N. Y.....	2 00

COWS AND HEIFERS.

3 years old or over, Henry Stevens & Son, Lacona, N. Y.....	15 00
Second premium, Henry Stevens & Son, Lacona, N. Y.....	10 00
Third premium, J. E. Goddard & Biedler, Willoughby, O.....	4 00
2 to 3 years old, J. E. Goddard & Biedler, Willoughby, O.....	10 00
Second premium, W. H. LaGrange & Son, Franklin, Ind.....	7 00
Third premium, Henry Stevens & Son, Lacona, N. Y.....	4 00
1 to 2 years old, W. H. LaGrange & Son, Franklin, Ind.....	8 00
Second premium, W. H. LaGrange & Son, Franklin, Ind.....	6 00
Third premium, J. E. Goddard & Biedler, Willoughby, O.....	3 00
Calf, J. E. Goddard & Biedler, Willoughby, O.....	5 00
Second premium, Henry Stevens & Son, Lacona, N. Y.....	3 00
Third premium, Henry Stevens & Son, Lacona, N. Y.....	2 00
Four animals, get of one sire, J. E. Goddard & Biedler, Willoughby, Ohio	10 00
Second premium, Henry Stevens & Son, Lacona, N. Y.....	7 00
Third premium, W. H. LaGrange & Son, Franklin, Ind.....	4 00
Two animals, produce of one cow, W. H. LaGrange & Son, Frank- lin, Ind.	10 00
Second premium, J. E. Goddard & Biedler, Willoughby, O.....	7 00
Third premium, Henry Stevens & Son, Lacona, N. Y.....	4 00
Exhibitor's herd, Henry Stevens & Son, Lacona, N. Y.....	20 00
Second premium, J. E. Goddard & Biedler, Willoughby, O.....	10 00
Breeder's herd, W. H. LaGrange & Son, Franklin, Ind.....	20 00
Second premium, Henry Stevens & Son, Lacona, N. Y.....	10 00

SWEEPSTAKES.

Bull, Henry Stevens & Son, Lacona, N. Y.....	20 00
Cow or helper, Henry Stevens & Son, Lacona, N. Y.....	20 00

CLASS XVIII—Ayrshire.

(M. A. Scovell, Judge.)

BULLS.

3 years old or over, J. T. Converse & Co., Woodville, N. Y.....	\$15 00
2 to 3 years old, J. T. Converse & Co., Woodville, N. Y.....	10 00
1 to 2 years old, J. T. Converse & Co., Woodville, N. Y.....	8 00

Calf, J. T. Converse & Co., Woodville, N. Y.....	5 00
Second premium, J. T. Converse & Co., Woodville, N. Y.....	3 00

COWS AND HEIFERS.

3 years old or over, J. T. Converse & Co., Woodville, N. Y.....	15 00
Second premium, J. T. Converse & Co., Woodville, N. Y.....	10 00
Third premium, J. T. Converse & Co., Woodville, N. Y.....	5 00
2 to 3 years old, J. T. Converse & Co., Woodville, N. Y.....	10 00
Second premium, J. T. Converse & Co., Woodville, N. Y.....	7 00
1 to 2 years old, J. T. Converse & Co., Woodville, N. Y.....	8 00
Second premium, J. T. Converse & Co., Woodville, N. Y.....	6 00
Calf, J. T. Converse & Co., Woodville, N. Y.....	5 00
Second premium, J. T. Converse & Co., Woodville, N. Y.....	3 00
Four animals, get of one sire, J. T. Converse & Co., Woodville, N. Y.	10 00
Two animals, produce of one cow, J. T. Converse & Co., Woodville, N. Y.	10 00
Second premium, J. T. Converse & Co., Woodville, N. Y.....	7 00
Exhibitor's herd, J. T. Converse & Co., Woodville, N. Y.....	20 00
Second premium, J. T. Converse & Co., Woodville, N. Y.....	10 00
Breeder's herd, J. T. Converse & Co., Woodville, N. Y.....	20 00

SWEEPSTAKES.

Bulls, J. T. Converse & Co., Woodville, N. Y.....	20 00
Cows and heifers, J. T. Converse & Co., Woodville, N. Y.....	20 00

CLASS XIX—Guernseys.

(M. A. Scovell, Judge.)

BULLS.

3 years old or over, L. V. Axtell, Perry, O.....	\$15 00
2 to 3 years old, L. V. Axtell, Perry, O.....	10 00
1 to 2 years old, L. V. Axtell, Perry, O.....	8 00
Calf, L. V. Axtell, Perry, O.....	5 00
Second premium, L. V. Axtell, Perry, O.....	3 00

COWS AND HEIFERS.

3 years old or over, L. V. Axtell, Perry, O.....	15 00
Second premium, L. V. Axtell, Perry, O.....	10 00
Third premium, L. V. Axtell, Perry, O.....	5 00
2 to 3 years old, L. V. Axtell, Perry, O.....	10 00
Second premium, L. V. Axtell, Perry, O.....	7 00
Third premium, L. V. Axtell, Perry, O.....	4 00

1 to 2 years old, L. V. Axtell, Perry, O.....	8 00
Second premium, L. V. Axtell, Perry, O.....	6 00
Calf, L. V. Axtell, Perry, O.....	5 00
Second premium, L. V. Axtell, Perry, O.....	3 00
Four animals, get of one sire, L. V. Axtell, Perry, O.....	10 00
Second premium, L. V. Axtell, Perry, O.....	7 00
Two animals, produce of one cow, L. V. Axtell, Perry, O.....	10 00
Second premium, L. V. Axtell, Perry, O.....	7 00
Exhibitor's herd, L. V. Axtell, Perry, O.....	20 00
Second premium, L. V. Axtell, Perry, O.....	10 00
Breeder's herd, L. V. Axtell, Perry, O.....	20 00

SWEEPSTAKES.

Bulls, L. V. Axtell, Perry, O.....	20 00
Cows or heifers, L. V. Axtell, Perry, O.....	20 00

CLASS XXXVI—Dairy and Creamery Products.

(E. F. Doolittle, Judge.)

30 lbs. tub creamery butter, Robert McBeth, Farland, Ind.....	\$20 00
15 lbs. dairy butter, Arthur Hoadley, Oakley, Ind.....	20 00
5 lbs. dairy butter, Arthur Hoadley, Oakley, Ind.....	15 00
Second premium, Mrs. E. T. Drake, Edinburg, Ind.....	10 00
5 lbs. dairy butter, made by a girl under 20 years, Edna Neff, Syracuse, Ind.	15 00
Second premium, Odessa Coffin, Carmel, Ind.....	10 00
5 lbs. dairy butter, made by a graduate of a dairy school, Arthur Hoadley, Oakley, Ind.....	15 00
Cream cheese, A. Schoeman, Plain, Wis.....	20 00
Second premium, Boyd & Drischel, Cambridge City, Ind.....	10 00
Cottage cheese, Mrs. Alvah Sample, Greenfield, Ind.....	10 00
Second premium, Boyd & Drischel, Cambridge City, Ind.....	5 00

Respectfully submitted,

MORTIMER LEVERING,

Superintendent.

REPORT OF SUPERINTENDENT OF SHEEP.

To the President and Delegate State Board of Agriculture:

Gentlemen—The undersigned begs leave to submit the following as his report as Superintendent of the Exhibit of Sheep at the Fair of 1898:

There is perhaps no department connected with the work of the State Board of Agriculture so pleasant and easily handled as the sheep depart-

ment. The purity and refining influence of the lamb is transmitted to the owners and exhibitors. When you meet a wool grower or sheep breeder, you will invariably meet a refined gentleman, and one who is satisfied with the right thing, and knows and appreciates fair treatment even in the hands of the judge. The judges this year—Mr. Phelps and Mr. Privett—were men of such well-known worth and integrity, as well as recognized ability to judge in any and all classes, that there could be no dissent or appeal from their decision. Mr. E. H. Peed, who was my assistant, added much to the pleasure and success of the meeting. The whole number of sheep exhibited probably exceeded that of any other previous year since the organization of the State Board. The display in all classes was superior in quality as well as quantity. I regret that in one or two of the newer classes there were no premiums to be awarded, as the exhibition was complimentary, both to the State Board and exhibitor, and I would recommend, respectfully, that they be given, if not a full class, a fair recognition.

Following are the awards:

CLASS XX—Shropshire Sheep.

(Uriah Privett, Judge.)

RAMS.

2 years old or over, George Allen, Allerton, Ill.....	\$10 00
Second premium, George Allen, Allerton, Ill.....	6 00
Third premium, Henry Klingler, Lebanon, Ind.....	4 00
1 to 2 years old, George Allen, Allerton, Ill.....	10 00
Second premium, George Allen, Allerton, Ill.....	6 00
Third premium, George Allen, Allerton, Ill.....	4 00
Lam, George Allen, Allerton, Ill.....	10 00
Second premium, George Allen, Allerton, Ill.....	6 00
Third premium, Wm. Axe & Son, Westchester, Ind.....	4 00

EWES.

2 years old or over, George Allen, Allerton, Ill.....	10 00
Second premium, I. J. Williams & Son, Muncie, Ind.....	6 00
Third premium, George Allen, Allerton, Ill.....	4 00
1 to 2 years old, George Allen, Allerton, Ill.....	10 00
Second premium, George Allen, Allerton, Ill.....	6 00
Third premium, George Allen, Allerton, Ill.....	4 00
Lamb, George Allen, Allerton, Ill.....	10 00
Second premium, George Allen, Allerton, Ill.....	6 00
Third premium, Wm. Axe & Son, Westchester, Ind.....	4 00

FLOCKS.

Aged flock, George Allen, Allerton, Ill.....	10 00
Second premium, George Allen, Allerton, Ill.....	6 00
Third premium, Wm. Axe & Son, Westchester, Ind.....	4 00
Young flock, George Allen, Allerton, Ill.....	10 00
Second premium, Wm. Axe & Son, Westchester, Ind.....	6 00
Third premium, George Allen, Allerton, Ill.....	4 00

SWEEPSTAKES.

Ram, George Allen, Allerton, Ill.....	10 00
Ewe, George Allen, Allerton, Ill.....	10 00

CLASS XXI—Oxford Down.

(T. C. Phelps, Judge.)

RAMS.

2 years old or over, Sid Conger, Hope, Ind.....	\$10 00
Second premium, R. J. Stone, Honington, Ill.....	6 00
1 to 2 years old, R. J. Stone, Honington, Ill.....	10 00
Second premium, Sid Conger, Hope, Ind.....	6 00
Third premium, R. J. Stone, Honington, Ill.....	4 00
Lamb, R. J. Stone, Honington, Ill.....	10 00
Second premium, Sid Conger, Hope, Ind.....	6 00
Third premium, R. J. Stone, Honington, Ill.....	4 00

EWES.

2 years old or over, R. J. Stone, Honington, Ill.....	10 00
Second premium, Sid Conger, Hope, Ind.....	6 00
Third premium, Sid Conger, Hope, Ind.....	4 00
1 to 2 years old, R. J. Stone, Honington, Ill.....	10 00
Second premium, R. J. Stone, Honington, Ill.....	6 00
Third premium, Sid Conger, Hope, Ind.....	4 00
Lamb, R. J. Stone, Honington, Ill.....	10 00
Second premium, Sid Conger, Hope, Ind.....	6 00
Third premium, R. J. Stone, Honington, Ill.....	4 00

FLOCKS.

Aged flock, R. J. Stone, Honington, Ill.....	10 00
Second premium, Sid Conger, Hope, Ind.....	6 00
Third premium, Sid Conger, Hope, Ind.....	2 00
Young flock, Sid Conger, Hope, Ind.....	10 00
Second premium, R. J. Stone, Honington, Ill.....	6 00

SWEEPSTAKES.

Ram, R. J. Stone, Honington, Ill.....	10 00
Ewe, R. J. Stone, Honington, Ill.....	10 00

CLASS XXII—Southdown.

(Uriah Privett, Judge.)

RAMS.

2 years old or over, George Allen, Allerton, Ill.....	\$10 00
Second premium, Sid Conger, Hope, Ind.....	6 00
Third premium, George Allen, Allerton, Ill.....	4 00
1 to 2 years old, George Allen, Allerton, Ill.....	10 00
Second premium, Watt Wilson & Son, Muncie, Ind.....	6 00
Third premium, George Allen, Allerton, Ill.....	4 00
Lamb, George Allen, Allerton, Ill.....	10 00
Second premium, George Allen, Allerton, Ill.....	6 00
Third premium, Watt Wilson & Son, Muncie, Ind.....	4 00

EWES.

2 years old or over, George Allen, Allerton, Ill.....	10 00
Second premium, George Allen, Allerton, Ill.....	6 00
Third premium, Watt Wilson & Son, Muncie, Ind.....	4 00
1 to 2 years old, George Allen, Allerton, Ill.....	10 00
Second premium, George Allen, Allerton, Ill.....	6 00
Third premium, Watt Wilson & Son, Muncie, Ind.....	4 00
Lamb, George Allen, Allerton, Ill.....	10 00
Second premium, Sid Conger, Hope, Ind.....	6 00
Third premium, George Allen, Allerton, Ill.....	4 00

FLOCKS.

Ag'd flock, George Allen, Allerton, Ill.....	10 00
Second premium, Watt Wilson & Son, Muncie, Ind.....	6 00
Third premium, Sid Conger, Hope, Ind.....	2 00
Young flock, George Allen, Allerton, Ill.....	10 00
Second premium, Watt Wilson & Son, Muncie, Ind.....	6 00

SWEEPSTAKES.

Ram, George Allen, Allerton, Ill.....	10 00
Ewe, George Allen, Allerton, Ill.....	10 00

CLASS XXIII—Hampshire Down.

(Uriah Privett, Judge.)

RAMS.

2 years old or over, John Milton, Marshall, Mich.....	\$5 00
1 to 2 years old, John Milton, Marshall, Mich.....	5 00
Second premium, John Milton, Marshall, Mich.....	3 00
Lamb, John Milton, Marshall, Mich.....	5 00
Second premium, John Milton, Marshall, Mich.....	2 00

EWES.

2 years old or over, John Milton, Marshall, Mich.....	5 00
Second premium, John Milton, Marshall, Mich.....	3 00
Third premium, John Milton, Marshall, Mich.....	2 00
1 to 2 years old, John Milton, Marshall, Mich.....	5 00
Second premium, John Milton, Marshall, Mich.....	3 00
Lamb, John Milton, Marshall, Mich.....	5 00
Second premium, John Milton, Marshall, Mich.....	3 00
Third premium, John Milton, Marshall, Mich.....	2 00

FLOCKS.

Aged flock, John Milton, Marshall, Mich.....	5 00
Second premium, John Milton, Marshall, Mich.....	3 00
Young flock, John Milton, Marshall, Mich.....	5 00
Second premium, John Milton, Marshall, Mich.....	3 00

SWEEPSTAKES.

Ram, John Milton, Marshall, Mich.....	5 00
Ewe, John Milton, Marshall, Mich.....	5 00

CLASS XXIV—Cotswold.

(T. C. Phelps, Judge.)

RAMS.

2 years old or over, Geo. Harding & Son, Waukesha, Wis.....	\$10 00
Second premium, Wilson Bros., Muncie, Ind.....	6 00
Third premium, Geo. Harding & Son, Waukesha, Wis.....	4 00
1 to 2 years old, Wilson Bros., Muncie, Ind.....	10 00
Second premium, Geo. Harding & Son, Waukesha, Wis.....	6 00
Third premium, Geo. Harding & Son, Waukesha, Wis.....	4 00
Lamb, Geo. Harding & Son, Waukesha, Wis.....	10 00
Second premium, Geo. Harding & Son, Waukesha, Wis.....	4 00

EWES.

2 years old or over, Geo. Harding & Son, Waukesha, Wis.....	10 00
Second premium, Wilson Bros., Muncie, Ind.....	6 00
Third premium, D. C. Lewis, Camp Point, Ill.....	4 00
1 to 2 years old, Wilson Bros., Muncie, Ind.....	10 00
Second premium, Geo. Harding & Son, Waukesha, Wis.....	6 00
Third premium, Wilson Bros., Muncie, Ind.....	4 00
Lamb, Wilson Bros., Muncie, Ind.....	10 00
Second premium, Geo. Harding & Son, Waukesha, Wis.....	6 00
Third premium, Wilson Bros., Muncie, Ind.....	4 00

FLOCKS.

Aged flock, Geo. Harding & Son, Waukesha, Wis.....	10 00
Second premium, Wilson Bros., Muncie, Ind.....	6 00
Third premium, D. C. Lewis, Camp Point, Ill.....	2 00
Young flock, Wilson Bros., Muncie, Ind.....	10 00
Second premium, Geo. Harding & Son, Waukesha, Wis.....	6 00
Third premium, D. C. Lewis, Camp Point, Ill.....	2 00

SWEEPSTAKES.

Ram, Geo. Harding & Son, Waukesha, Wis.....	10 00
Ewe, Wilson Bros., Muncie, Ind.....	10 00

CLASS XXV—Lincolns.

(T. C. Phelps, Judge.)

RAMS.

2 years old or over, Geo. Harding & Son, Waukesha, Wis.....	\$5 00
Lamb, Geo. Harding & Son, Waukesha, Wis.....	5 00
Second premium, Geo. Harding & Son, Waukesha, Wis.....	3 00

EWES.

2 years old or over, Geo. Harding & Son, Waukesha, Wis.....	5 00
1 to 2 years old, Geo. Harding & Son, Waukesha, Wis.....	5 00
Lamb, Geo. Harding & Son, Waukesha, Wis.....	5 00
Second premium, Geo. Harding & Son, Waukesha, Wis.....	3 00

FLOCKS.

Aged flock, Geo. Harding & Son, Waukesha, Wis.....	5 00
Young flock, Geo. Harding & Son, Waukesha, Wis.....	5 00

SWEEPSTAKES.

Ram, Geo. Harding & Son, Waukesha, Wis.....	5 00
Ewe, Geo. Harding & Son, Waukesha, Wis.....	5 00

CLASS XXVI—Rambouillet.

(Uriah Privett, Judge.)

RAMS.

2 years old or over, A. A. Bates, Irwin, O.....	\$5 00
Second premium, A. A. Bates, Irwin, O.....	3 00
1 to 2 years old, A. A. Bates, Irwin, O.....	5 00
Second premium, A. A. Bates, Irwin, O.....	3 00
Lamb, A. A. Bates, Irwin, O.....	5 00
Second premium, A. A. Bates, Irwin, O.....	3 00

EWES.

2 years old or over, Dwight Lincoln, Milford Center, O.....	5 00
Second premium, A. A. Bates, Irwin, O.....	3 00
Third premium, A. A. Bates, Irwin, O.....	2 00
1 to 2 years old, A. A. Bates, Irwin, O.....	5 00
Second premium, A. A. Bates, Irwin, O.....	3 00
Lamb, A. A. Bates, Irwin, O.....	5 00
Second premium, A. A. Bates, Irwin, O.....	3 00

FLOCKS.

Aged flock, A. A. Bates, Irwin, O.....	5 00
Second premium, A. A. Bates, Irwin, O.....	3 00
Young flock, A. A. Bates, Irwin, O.....	5 00
Second premium, A. A. Bates, Irwin, O.....	3 00

SWEEPSTAKES.

Ram, A. A. Bates, Irwin, O.....	5 00
Ewe, Dwight Lincoln, Milford Center, O.....	5 00

CLASS XXVII—Fine Wool, American Merino.

(Uriah Privett, Judge.)

RAMS.

2 years old or over, F. W. Perkins, West Mansfield, O.....	\$5 00
Second premium, Uriah Cook, West Mansfield, O.....	3 00
Third premium, Sam Gardiner, Fincastle, Ind.....	2 00

1 to 2 years old, F. W. Perkins, West Mansfield, O.....	5 00
Second premium, J. P. Baxla, Shelbyville, Ind.....	3 00
Third premium, Uriah Cook, West Mansfield, O.....	2 00
Lamb, Uriah Cook, West Mansfield, O.....	5 00
Second premium, J. P. Baxla, Shelbyville, Ind.....	3 00
Third premium, F. W. Perkins, West Mansfield, O.....	2 00

EWES.

2 years old or over, F. W. Perkins, West Mansfield, O.....	5 00
Second premium, J. M. Flanagan, Niles, O.....	3 00
Third premium, George Allen, Allerton, Ill.....	2 00
1 to 2 years old, F. W. Perkins, West Mansfield, O.....	5 00
Second premium, F. W. Perkins, West Mansfield, O.....	3 00
Third premium, J. M. Flanagan, Niles, O.....	2 00
Lamb, J. M. Flanagan, Niles, O.....	5 00
Second premium, F. W. Perkins, West Mansfield, O.....	3 00
Third premium, J. M. Flanagan, Niles, O.....	2 00

FLOCKS.

Aged flock, F. W. Perkins, West Mansfield, O.....	5 00
Second premium, J. M. Flanagan, Niles, O.....	3 00
Third premium, Uriah Cook, West Mansfield, O.....	2 00
Young flock, J. M. Flanagan, Niles, O.....	5 00
Second premium, F. W. Perkins, West Mansfield, O.....	3 00
Third premium, Uriah Cook, West Mansfield, O.....	2 00

SWEEPSTAKES.

Ram, F. W. Perkins, West Mansfield, O.....	5 00
Ewe, F. W. Perkins, West Mansfield, O.....	5 00

CLASS XXVIII—Delaine Merinos.

(Uriah Privett, Judge.)

RAMS.

2 years old or over, A. L. Gamber, Wakeman, O.....	\$5 00
Second premium, J. M. Flanagan, Niles, O.....	3 00
Third premium, C. H. Williams, Church, Mich.....	2 00
1 to 2 years old, A. L. Gamber, Wakeman, O.....	5 00
Second premium, C. H. Williams, Church, Mich.....	3 00
Third premium, A. L. Gamber, Wakeman, Mich.....	2 00
Lamb, A. L. Gamber, Wakeman, Mich.....	5 00
Second premium, A. L. Gamber, Wakeman, Mich.....	3 00
Third premium, C. H. Williams, Church, Mich.....	2 00

EWES.

2 years old or over, A. L. Gamber, Wakeman, O.....	5 00
Second premium, C. H. Williams, Church, Mich.....	3 00
Third premium, A. L. Gamber, Wakeman, O.....	2 00
1 to 2 years old, A. L. Gamber, Wakeman, O.....	5 00
Second premium, A. L. Gamber, Wakeman, O.....	3 00
Third premium, A. L. Gamber, Wakeman, O.....	2 00
Lamb, A. L. Gamber, Wakeman, O.....	5 00
Second premium, C. H. Williams, Church, Mich.....	3 00
Third premium, C. H. Williams, Church, Mich.....	2 00

FLOCKS.

Aged flock, A. L. Gamber, Wakeman, O.....	5 00
Second premium, C. H. Williams, Church, Mich.....	3 00
Third premium, J. M. Flanagan, Niles, O.....	2 00
Young flock, A. L. Gamber, Wakeman, O.....	5 00
Second premium, C. H. Williams, Church, Mich.....	3 00

SWEEPSTAKES.

Ram, A. L. Gamber, Wakeman, O.....	5 00
Ewe, A. L. Gamber, Wakeman, O.....	5 00

CLASS XXIX.

(Uriah Privett, Judge.)

RAMS.

2 to 3 years old, W. S. Crodian, Fincastle, Ind.....	\$5 00
Second premium, W. S. Crodian, Fincastle, Ind.....	3 00
1 to 2 years old, W. S. Crodian, Fincastle, Ind.....	5 00
Second premium, W. S. Crodian, Fincastle, Ind.....	3 00
Lamb, W. S. Crodian, Fincastle, Ind.....	5 00
Second premium, W. S. Crodian, Fincastle, Ind.....	3 00

EWES.

2 years old or over, W. S. Crodian, Fincastle, Ind.....	5 00
Second premium, W. S. Crodian, Fincastle, Ind.....	3 00
Third premium, W. S. Crodian, Fincastle, Ind.....	2 00
1 to 2 years old, W. S. Crodian, Fincastle, Ind.....	5 00
Second premium, W. S. Crodian, Fincastle, Ind.....	3 00
Lamb, W. S. Crodian, Fincastle, Ind.....	5 00
Second premium, W. S. Crodian, Fincastle, Ind.....	3 00

FLOCKS.

Aged flock, W. S. Crodian, Fincastle, Ind.....	5 00
Second premium, W. S. Crodian, Fincastle, Ind.....	3 00
Young flock, W. S. Crodian, Fincastle, Ind.....	5 00

SWEEPSTAKES.

Ram, W. S. Crodian, Fincastle, Ind.....	5 00
Ewe, W. S. Crodian, Fincastle, Ind.....	5 00

Respectfully submitted,

H. B. HOWLAND,
Superintendent.

REPORT OF SUPERINTENDENT OF SWINE DEPARTMENT.

To the Delegate State Board of Agriculture:

Mr. President and Gentlemen—The swine exhibition at our State Fair in September, 1898, was excellent, both in quantity and quality. The exhibitors were a splendid set of men to associate with, and, from the many kindly expressions made by them, I have every reason to believe they were well pleased.

The department was overcrowded. Many exhibitors had to accept a less number of pens than they felt that they required, and even after bunching together as could best be done, new pens had to be made in one of the horse barns for about fifty head of swine.

I do not see how this department can well take care of itself in the future without the rebuilding of the two sheds that were blown down during the Fair of 1897. I therefore recommend that they be rebuilt. The floors in the pens are so much out of repair that it will be impossible to again use more than a small number of them in their present condition. Floors, therefore, must be rebuilt. I join in the recommendation of my predecessor in this department and "think a good plan would be to make floors entirely independent of the pens and then stand them on edge when not in use." They should also be built of two-inch lumber.

The upstairs of the main show building, I think, should be strengthened and bunks built for the use of exhibitors and their men, and that a place for keeping feed should be provided.

The damage done to the swine department by the soldiers during the past year is apparent upon every hand and many repairs are made necessary on this account.

Following are the various entries:

Class XXX	112
Class XXXI	281
Class XXXII	201
Class XXXIII	157
Class XXXIV	74
Total	825

The expenses of the department amounted to \$29.

The awards were as follows:

CLASS XXX—Berkshire.

(Adam F. May, Judge.)

BOARS.

2 years old or over, Reuben Gentry, Danville, Ky.....	\$12 00
Second premium, Reuben Gentry, Danville, Ky.....	8 00
Third premium, W. H. McQuiston, Franklin, Ind.....	4 00
1 to 2 years old, A. S. Gilmore, Greensburg, Ind.....	10 00
Second premium, Reuben, Gentry, Danville, Ky.....	7 00
Third premium, W. A. Hart, Portland, Ind.....	3 00
6 months to 1 year old, I. N. Barker & Son, Thorntown, Ind.....	8 00
Second premium, Caldwell Norton, Louisville, Ky.....	5 00
Third premium, A. S. Gilmore, Greensburg, Ind.....	2 00
Under 6 months, I. N. Barker & Son, Thorntown, Ind.....	8 00
Second premium, Reuben Gentry, Danville, Ky.....	5 00
Third premium, I. N. Barker & Son, Thorntown, Ind.....	2 00

SOWS.

2 years old or over, Reuben Gentry, Danville, Ky.....	12 00
Second premium, Reuben Gentry, Danville, Ky.....	8 00
Third premium, W. H. McQuiston, Franklin, Ind.....	4 00
1 to 2 years old, Reuben Gentry, Danville, Ky.....	10 00
Second premium, W. A. Hart, Portland, Ind.....	7 00
Third premium, Reuben Gentry, Danville, Ky.....	3 00
6 months to 1 year old, Caldwell Norton, Louisville, Ky.....	8 00
Second premium, Caldwell Norton, Louisville, Ky.....	5 00
Third premium, A. S. Gilmore, Greensburg, Ind.....	2 00
Under 6 months, I. N. Barker & Son, Thorntown, Ind.....	8 00
Second premium, Reuben Gentry, Danville, Ky.....	5 00
Third premium, I. N. Barker & Son, Thorntown, Ind.....	2 00

HERDS.

Boar and 3 sows over 1 year old, Reuben Gentry, Danville, Ky....	20 00
Second premium, Reuben Gentry, Danville, Ky.....	10 00
Boar and 3 sows under 1 year old, I. N. Barker & Son, Thorntown, Ind.	15 00
Second premium, Caldwell Norton, Louisville, Ky.....	10 00
5 pigs under 1 year old, get of one bear, A. S. Gilmore, Greensburg, Ind.	12 00
Second premium, I. N. Barker & Son, Thorntown, Ind.....	8 00
5 pigs, the produce of one sow, A. S. Gilmore, Greensburg, Ind....	12 00
Second premium, I. N. Barker & Son, Thorntown, Ind.....	8 00
5 pigs, I. N. Barker & Son, Thorntown, Ind.....	12 00
Second premium, I. N. Barker & Son, Thorntown, Ind.....	8 00

SWEEPSTAKES.

(John Harcourt and E. W. Hill, Judges.)

Boar, Reuben Gentry, Danville, Ky.....	20 00
Sow, Reuben Gentry, Danville, Ky.....	20 00

CLASS XXXI—Poland China.

(Ed. Klever, Judge.)

BOARS.

2 years old or over, J. T. Hackney, Oakland, Ky.....	\$12 00
Second premium, Ed R. Dorsey, Perry, Ill.....	8 00
Third premium, Henry Brust, Mt. Carmel, Ill.....	4 00
1 to 2 years old, Churchill & Marriot, Elizabethtown, Ky.....	10 00
Second premium, A. S. Gilmore, Greensburg, Ind.....	7 00
Third premium, W. H. Hughes, Brownsburg, Ind.....	3 00
6 months to 1 year old, J. W. Williams & Son, Briant, Ind.....	8 00
Second premium, J. W. Williams & Son, Briant, Ind.....	5 00
Third premium, W. O. Reveal, Indianapolis, Ind.....	2 00
Under 6 months, Theo. Templeton, Hope, Ind.....	8 00
Second premium, A. W. Rose, Muncie, Ind.....	5 00
Third premium, Wilkins & Son, New Lancaster, Ind.....	2 00

SOWS.

2 years old or over, R. L. Bratton, New Ross, Ind.....	12 00
Second premium, Wilkins & Son, New Lancaster, Ind.....	8 00
Third premium, J. T. Hackney, Oakland, Ky.....	4 00
1 to 2 years old, Churchill & Marriot, Elizabethtown, Ky.....	10 00

Second premium, Ed R. Dorsey, Perry, Ill.....	7 00
Third premium, H. Bradford & Son, Rochester, O.....	3 00
6 months to 1 year old, D. R. Perry, Columbus, Ind.....	8 00
Second premium, Lucien Arbuckle, Hope, Ind.....	5 00
Third premium, R. L. Bratton, New Ross, Ind.....	2 00
Under 6 months, W. O. Reveal, Indianapolis, Ind.....	8 00
Second premium, Ad. F. Mann, Flat Rock, Ind.....	5 00
Third premium, W. H. Hughes, Brownsburg, Ind.....	2 00
Boar and 3 sows over 1 year old, Churchill & Marriot, Elizabethtown, Ky.	20 00
Second premium, Ed R. Dorsey, Perry, Ill.....	10 00
Boar and 3 sows not 1 year old, J. W. Williams & Son, Briant, Ind.	15 00
Second premium, W. O. Reveal, Indianapolis, Ind.....	10 00
5 pigs, get of one boar, W. O. Reveal, Indianapolis, Ind.....	12 00
Second premium, J. W. Williams & Son, Briant, Ind.....	8 00
5 pigs, get of one sow, W. O. Reveal, Indianapolis, Ind.....	12 00
Second premium, S. D. Ghere, Thorntown, Ind.....	8 00
Pigs, W. C. Williams & Co., Knightstown, Ind.....	12 00
Second premium, Ad. F. Mann, Flat Rock, Ind.....	8 00

SWEEPSTAKES.

(C. W. Haines, Judge.)

Boar, Churchill & Marriot, Elizabethtown, Ky.....	20 00
Sow, Churchill & Marriot, Elizabethtown, Ky.....	20 00

CLASS XXXII—Chester White, Victoria, Cheshire and Large Yorkshire.

(Elmer Shrader, Judge.)

BOARS.

2 years old or over, W. H. LaGrange & Son, Franklin, Ind.....	\$12 00
Second premium, W. H. LaGrange & Son, Franklin, Ind.....	8 00
Third premium, Dorsey Bros., Perry, Ill.....	4 00
1 to 2 years old, W. W. Wilner & Son, Thorntown, Ind.....	10 00
Second premium, Hinshaw Bros., Zionsville and Sheridan, Ind....	7 00
Third premium, Dorsey Bros., Perry, Ill.....	3 00
6 months to 1 year old, E. H. Acre, Elsie, Mich.....	8 00
Second premium, W. H. LaGrange & Son, Franklin, Ind.....	5 00
Third premium, E. H. Acre, Elsie, Mich.....	2 00
Under 6 months, H. A. Cook, Ladoga, Ind.....	8 00
Second premium, B. W. Harvey & Co., Bloomingdale, Ind.....	5 00
Third premium, W. H. LaGrange & Son, Franklin, Ind.....	2 00

SOWS.

2 years old or over, W. H. LaGrange & Son, Franklin, Ind.....	12 00
Second premium, E. H. Acre, Elsie, Mich.....	8 00
Third premium, Geo. W. Trone, Rushville, Ind.....	4 00
1 to 2 years old, Geo. W. Trone, Rushville, Ind.....	10 00
Second premium, W. H. LaGrange & Son, Franklin, Ind.....	7 00
Third premium, Hinshaw Bros., Sheridan, Ind.....	3 00
6 months to 1 year old, Dorsey Bros., Perry, Ill.....	8 00
Second premium, Dorsey Bros., Perry, Ill.....	5 00
Third premium, B. W. Harvey & Co., Bloomington, Ind.....	2 00
Under 6 months, R. L. Russel, Zionsville, Ind.....	8 00
Second premium, B. W. Harvey & Co., Bloomington, Ind.....	5 00
Third premium, W. H. LaGrange & Son, Franklin, Ind.....	2 00

HERDS.

Boar and 3 sows over 1 year old, W. H. LaGrange & Son, Franklin, Ind.....	20 00
Second premium, Dorsey Bros., Perry, Ill.....	10 00
Boar and 3 sows under 1 year, E. A. Acre, Elsie, Mich.....	15 00
Second premium, Dorsey Bros., Perry, Ill.....	10 00
5 pigs, get of one boar, Dorsey Bros., Perry, Ill.....	12 00
Second premium, E. H. Acre, Elsie, Mich.....	8 00
5 pigs, produce of one sow, Dorsey Bros., Perry, Ill.....	12 00
Second premium, E. H. Acre, Elsie, Mich.....	8 00
5 pigs, R. L. Russel, Zionsville, Ind.....	12 00
Second premium, B. W. Harvey & Co., Bloomington, Ind.....	8 00

SWEEPSTAKES.

(Adam F. May, Judge.)

Boar, W. H. LaGrange & Son, Franklin, Ind.....	20 00
Sow, W. H. LaGrange & Son, Franklin, Ind.....	20 00

CLASS XXXIII—Duroc, Jersey, Tainworth and Thin Rind.

(Adam F. May, Judge.)

BOARS.

2 years old or over, J. B. Jones, Franklin, Ind.....	\$12 00
Second premium, Hardesty & Moorman, Winchester, Ind.....	8 00
Third premium, G. W. Simpson, Portland, Ind.....	4 00
1 to 2 years old, Hardesty & Moorman, Winchester, Ind.....	10 00
Second premium, Geo. W. Trone, Rushville, Ind.....	7 00
Third premium, Browning & Seckman, Versailles, Ill.....	3 00

6 months to 1 year old, Browning & Seckman, Versailles, Ill.....	8 00
Second premium, J. B. Jones, Franklin, Ind.....	5 00
Third premium, G. W. Simpson & Sons, Portland, Ind.....	2 00
Under 6 months, G. W. Simpson & Sons, Portland, Ind.....	8 00
Second premium, J. B. Jones, Franklin, Ind.....	5 00
Third premium, D. W. Brown, Castle, Ind.....	2 00

SOWS.

2 years old or over, Perry King, Columbus, Ind.....	12 00
Second premium, Hardesty & Moorman, Winchester, Ind.....	8 00
Third premium, Hardesty & Moorman, Winchester, Ind.....	4 00
1 to 2 years old, Geo. W. Trone, Rushville, Ind.....	10 00
Second premium, Geo. W. Trone, Rushville, Ind.....	7 00
Third premium, Perry King, Columbus, Ind.....	3 00
6 months to 1 year old, Geo. W. Trone, Rushville, Ind.....	8 00
Second premium, Hardesty & Moorman, Winchester, Ind.....	5 00
Third premium, Hardesty & Moorman, Winchester, Ind.....	2 00
Under 6 months, Hardesty & Moorman, Winchester, Ind.....	8 00
Second premium, Browning & Seckman, Versailles, Ill.....	5 00
Third premium, Wool Bros., Loree, Ind.....	2 00

HERDS.

Boar and 3 sows over 1 year old, Geo. W. Trone, Rushville, Ind...	20 00
Second premium, J. B. Jones, Franklin, Ind.....	10 00
Boar and 3 sows under 1 year, Geo. W. Trone, Rushville, Ind.....	15 00
Second premium, Browning & Seckman, Versailles, Ill.....	10 00
5 pigs, get of one boar, Hardesty & Moorman, Winchester, Ind...	12 00
Second premium, Geo. W. Trone, Rushville, Ind.....	8 00
5 pigs, produce of one sow, Hardesty & Moorman, Winchester, Ind.	12 00
Second premium, Geo. W. Trone, Rushville, Ind.....	8 00
5 pigs, Hardesty & Moorman, Winchester, Ind.....	12 00
Second premium, Browning & Seckman, Versailles, Ill.....	8 00

SWEEPSTAKES.

(Adam F. May, Judge.)

Boar, Geo. W. Trone, Rushville, Ind.....	20 00
Sow, Geo. W. Trone, Rushville, Ind.....	20 00

CLASS XXXIV—Essex, Suffolk and Small Yorkshire.

(I. N. Barker, Judge.)

BOARS.

2 years old or over, Stolz Bros., Westchester, Ind.....	\$6 00
Second premium, Bascom & McMurry, California, Mich.....	4 00
Third premium, Bascom & McMurry, California, Mich.....	2 00

1 to 2 years old, A. C. Green & Son, Winchester, Ind.	5 00
Second premium, Bascom & McMurry, California, Mich.	3 00
Third premium, Stolz Bros., Westchester, Ind.	2 00
6 months to 1 year old, Bascom & McMurry, California, Mich.	4 00
Second premium, Bascom & McMurry, California, Mich.	3 00
Third premium, A. C. Green & Son, Winchester, Ind.	2 00
Under 6 months, Bascom & McMurry, California, Mich.	4 00
Second premium, Bascom & McMurry, California, Mich.	3 00
Third premium, A. C. Green & Son, Winchester, Ind.	2 00

SOWS.

2 years old or over, Stolz Bros., Westchester, Ind.	6 00
Second premium, Bascom & McMurry, California, Mich.	4 00
Third premium, Bascom & McMurry, California, Mich.	2 00
1 to 2 years old, Bascom & McMurry, California, Mich.	5 00
Second premium, A. C. Green & Son, Winchester, Ind.	3 00
Third premium, Stolz Bros., Westchester, Ind.	2 00
6 months to 1 year, Bascom & McMurry, California, Mich.	4 00
Second premium, Bascom & McMurry, California, Mich.	3 00
Third premium, A. C. Green & Son, Winchester, Ind.	2 00
Under 6 months, A. C. Green & Son, Winchester, Ind.	4 00
Second premium, A. C. Green & Son, Winchester, Ind.	3 00
Third premium, Bascom & McMurry, California, Mich.	2 00

HERDS.

Boars and 3 sows over 1 year, Bascom & McMurry, California, Mich.	10 00
Second premium, A. C. Green & Son, Winchester, Ind.	5 00
Boar and 3 sows not 1 year, Bascom & McMurry, California, Mich.	8 00
Second premium, A. C. Green & Son, Winchester, Ind.	5 00
5 pigs, get of one boar, Bascom & McMurry, California, Mich.	6 00
Second premium, A. C. Green & Son, Winchester, Ind.	4 00
5 pigs, produce of one sow, Bascom & McMurry, California, Mich.	6 00
Second premium, A. C. Green & Son, Winchester, Ind.	4 00
5 pigs, A. C. Green & Son, Winchester, Ind.	6 00
Second premium, Bascom & McMurry, California, Mich.	4 00

SWEEPSTAKES.

(I. N. Barker, Judge.)

Boar, A. C. Green & Son, Winchester, Ind.	10 00
Sow, Bascom & McMurry, California, Mich.	10 00

Respectfully submitted,

MASON J. NIBLACK,

Superintendent.

REPORT OF SUPERINTENDENT OF POULTRY.

To the Delegate State Board of Agriculture:

Mr. President and Members of the Delegate State Board of Agriculture—In presenting you the report of the annual poultry show in connection with the Indiana State Fair, it gives me much pleasure to inform you that this department was admired and praised for the excellence and number of its exhibits by the numerous visitors and breeders. I was told by the oldest exhibitors that this show excelled anything that had ever been held on the State Fair grounds in point of numbers and in quality also. The large building would not begin to hold all of the exhibit, so that a large tent was provided for the water fowls. In view of this fact I would recommend that the space heretofore taken up by the pigeon and pet stock in the south wing of the poultry building be fitted with coops for the reception of the growing poultry exhibit.

Much annoyance was caused by the faulty construction of the openings in the poultry coops, permitting valuable birds to escape. I would recommend that these be remodeled.

I would also recommend that the doors to the building be refitted so that they can be secured against intruders.

This show was a surprise to most breeders and exhibitors, as the young stock was well enough developed for a winter show. Many of the specimens that did not win a place would score well up in the nineties. The Barred, White and Buff Plymouth Rocks were very excellent, especially the Barred ones; and they were also the largest class in the show. Brahmas were very strong, and a large class in both Light and Dark. The Cochins were out in large numbers and of good quality. Black Langshans were elegant, especially the pullets. Silver Laced Wyandottes were best in the pullet line. Leghorns were extra fine in all colors. S. S. Hamburgs had a very large show, with some excellent specimens. Red Caps good. Indian Games splendid, but not a large show. Houdans and Polish were well represented. The Bantams were out in great numbers, and of splendid quality. Too much can not be said of the turkeys, ducks and geese exhibited. They were a good show in themselves. There were 94 exhibitors and close to 2,300 birds. Total expense of the department, \$111.90.

The following are the awards:

CLASS XXXV—Poultry.

(H. A. Bridge, Judge.)

ASIATICS.

Light Braham cock, N. E. Woods, Pecksburg, Ind.....	\$2 00
Second premium, N. E. Woods, Pecksburg, Ind.....	1 00
Light Brahma hen, N. E. Woods, Pecksburg, Ind.....	2 00

Second premium, F. M. Sanford, Philadelphia, Ind.....	1 00
Light Brahma cockerel, Chas. A. Snyder, Waynetown, Ind.....	2 00
Second premium, Chas. A. Snyder, Waynetown, Ind.....	1 00
Light Brahma pullet, Chas. A. Snyder Waynetown, Ind.....	2 00
Second premium, Chas. A. Snyder, Waynetown, Ind.....	1 00
Dark Brahma cock, B. F. Duncan, Greenfield, Ind.....	1 50
Second premium, J. J. Burnside, Milligan, Ind.....	50
Dark Brahma hen, T. H. Buck, Morristown, Ind.....	1 50
Second premium, J. P. Baxla, Anthony, Ind.....	50
Dark Brahma cockerel, B. F. Duncan, Greenfield, Ind.....	1 50
Second premium, T. H. Buck, Morristown, Ind.....	50
Dark Brahma pullet, B. F. Duncan, Greenfield, Ind.....	1 50
Second premium, B. F. Duncan, Greenfield, Ind.....	50
Buff Cochín cock, Warbritton Bros., Ladoga, Ind.....	2 00
Second premium, Sid Conger, Hope, Ind.....	1 00
Buff Cochín hen, C. W. Phillips, Arlington, Ind.....	2 00
Second premium, Sid Conger, Hope, Ind.....	1 00
Buff Cochín cockerel, John E. Walker, Martinsville, Ind.....	2 00
Second premium, Warbritton Bros., Ladoga, Ind.....	1 00
Buff Cochín pullet, Chas. McClave, New London, Ohio.....	2 00
Second premium, J. J. Burnside, Milligan, Ind.....	1 00
Partridge Cochín cock, W. R. Zike & Son, Morristown, Ind.....	2 00
Second premium, Chas. McClave, New London, Ohio.....	1 00
Partridge Cochín hen, C. E. Smith & Son, Ashley Ohio.....	2 00
Second premium, Chas. McClave, New London, Ohio.....	1 00
Partridge Cochín cockerel, W. R. Zike & Son, Morristown, Ind....	2 00
Second premium, Sid Conger, Hope, Ind.....	1 00
Partridge Cochín pullet, C. E. Smith & Co., Ashley, Ohio.....	2 00
Second premium, C. E. Smith & Co., Ashley, Ohio.....	1 00
White Cochín cock, E. L. May, Indianapolis, Ind.....	1 50
Second premium, W. O. Swain, Manilla, Ind.....	50
White Cochín hen, F. M. Smiley & Son, Milligan, Ind.....	1 50
Second premium, W. O. Swain, Manilla, Ind.....	50
White Cochín cockerel, Warbritton Bros., Ladoga, Ind.....	1 50
Second premium, F. N. Smiley & Son, Milligan, Ind.....	50
White Cochín pullet, Warbritton Bros., Ladoga, Ind.....	1 50
Second premium, Warbritton Bros., Ladoga, Ind.....	50
Buff cochín cock, T. H. Buck, Morristown, Ind.....	2 00
Second premium, Seidensticker & Son, Brightwood, Ind.....	1 00
Buff Cochín hen, B. F. Hall, Indianapolis, Ind.....	2 00
Second premium, T. H. Buck, Morristown, Ind.....	1 00
Buff Cochín cockerel, B. F. Hall, Indianapolis, Ind.....	2 00
Second premium, Seidensticker & Son, Brightwood, Ind.....	1 00
Buff Cochín pullet, Seidensticker & Son, Brightwood, Ind.....	2 00
Second premium, Seidensticker & Son, Brightwood, Ind.....	1 00

Black Langshan cock, Sid Conger, Hope, Ind.....	2 00
Second premium, Sid Conger, Hope, Ind.....	1 00
Black Langshan hen, Sid Conger, Hope, Ind.....	2 00
Second premium, Sid Conger, Hope, Ind.....	1 00
Black Langshan cockerel, Chas. A. Snyder, Waynetown, Ind.....	2 00
Second premium, Donald Harvey, Cambridge City, Ind.....	1 00
Black Langshan, pullet, Chas. A. Snyder, Waynetown, Ind.....	2 00
Second premium, Chas. A. Snyder, Waynetown, Ind.....	1 00
White Langshan cock, T. H. Buck, Morristown, Ind.....	1 50
Second premium, Grant R. Baxter, Hillsdale, Mich.....	50
White Langshan hen, Grant R. Baxter, Hillsdale, Mich.....	1 50
Second premium, F. N. Smiley & Son, Milligan, Ind.....	50
Black Langshan cockerel, Donald Harvey, Cambridge City, Ind...	1 50
Second premium, Grant R. Baxter, Hillsdale, Mich.....	50
W. Langshan pullet, Donald Harvey, Cambridge City, Ind.....	1 50
Second premium, Donald Harvey, Cambridge City, Ind.....	50

AMERICAN.

Barred Plymouth Rock cock, Chas. McClave, New London, O.....	2 00
Second premium, Chas. McClave, New London, O.....	1 00
Barred Plymouth Rock hen, W. O. Swain, Manilla, Ind.....	2 00
Second premium, Chas. B. Sayers, Frankfort, Ind.....	1 00
Barred Plymouth Rock cockerel, Sid Conger, Hope, Ind.....	2 00
Second premium, Sid Conger, Hope, Ind.....	1 00
Barred Plymouth Rock pullet, Sid Conger, Hope, Ind.....	2 00
Second premium, Sid Conger, Hope, Ind.....	1 00
White Plymouth Rock cock, U. R. Fishel, Hope, Ind.....	2 00
Second premium, Painter & Grose, Middleton, Ind.....	1 00
White Plymouth Rock hen, U. R. Fishel, Hope, Ind.....	2 00
Second premium, Painter & Grose, Middleton, Ind.....	1 00
White Plymouth Rock cockerel, U. R. Fishel, Hope, Ind.....	2 00
Second premium, U. R. Fishel, Hope, Ind.....	1 00
White Plymouth Rock pullet, Sid Conger, Hope, Ind.....	2 00
Second premium, U. R. Fishel, Hope, Ind.....	1 00
Buff Plymouth Rock cock, Mrs. E. J. Reynolds, Haskells, Ind....	2 00
Second premium, Mrs. E. J. Reynolds, Haskells, Ind.....	1 00
Buff Plymouth Rock hen, F. E. Mow, Union Mills, Ind.....	2 00
Second premium, Chas. McClave, New London, O.....	1 00
Buff Plymouth Rock cockerel, F. E. Mow, Union Mills, Ind.....	2 00
Second premium, F. E. Mow, Union Mills, Ind.....	1 00
Buff Plymouth Rock pullet, F. E. Mow, Union Mills, Ind.....	2 00
Second premium, F. E. Mow, Union Mills, Ind.....	1 00
Buff Wyandotte cock, Farber Bros., Sandyville, O.....	1 00
Buff Wyandotte hen, Farber Bros., Sandyville, O.....	1 00
Silver Wyandotte cock, Chas. McClave, New London, O.....	2 00

Second premium, Winningham & Smith, Plumtree, Ind.....	1 00
Silver Wyandotte hen, F. N. Smiley & Son, Milligan, Ind.....	2 00
Second premium, Jones & Reeves, Clifford, Ind.....	1 00
Silver Wyandotte cockerel, Jones & Reeves, Clifford, Ind.....	2 00
Second premium, Chas. B. Sayers, Frankfort, Ind.....	1 00
Silver Wyandotte pullet, Jones & Reeves, Clifford, Ind.....	2 00
Second premium, Jones & Reeves, Clifford, Ind.....	1 00
Golden Wyandotte cock, Chas. McClave, New London, O.....	2 00
Second premium, Grant R. Baxter, Hillsdale, Mich.....	1 00
Golden Wyandotte hen, Chas. McClave, New London, O.....	2 00
Second premium, C. W. Phillips, Arlington, Ind.....	1 00
Golden Wyandotte cockerel, C. E. Smith & Co., Ashley, O.....	2 00
Second premium, C. E. Smith & Co., Ashley, O.....	1 00
Golden Wyandotte pullet, C. E. Smith & Co., Ashley, O.....	2 00
Second premium, C. E. Smith & Co., Ashley, O.....	1 00
White Wyandotte cock, Grant R. Baxter, Hillsdale, Mich.....	2 00
Second premium, Chas. McClave, New London, O.....	1 00
White Wyandotte hen, Chas. McClave, New London, O.....	2 00
Second premium, Jos. Haas, Indianapolis, Ind.....	1 00
White Wyandotte cockerel, Jones & Reeves, Clifford, Ind.....	2 00
Second premium, Chas. McClave, New London, O.....	1 00
White Wyandotte pullet, Jones & Reeves, Clifford, Ind.....	2 00
Second premium, Chas. McClave, New London, O.....	1 00

GAME.

Black-breasted red cock, Wesley Lanins, Greensburg, Ind.....	2 00
Second premium, Wesley Lanins, Greensburg, Ind.....	1 00
Black-breasted red hen, Wesley Lanins, Greensburg, Ind.....	2 00
Second premium, Wesley Lanins, Greensburg, Ind.....	1 00
Black-breasted red cockerel, Wesley Lanins, Greensburg, Ind.....	2 00
Second premium, J. A. Guillimare, Fincastle, Ind.....	1 00
Black-breasted red pullet, Wesley Lanins, Greensburg, Ind.....	2 00
Second premium, Wesley Lanins, Greensburg, Ind.....	1 00
Cornish Indian cock, Wesley Lanins, Greensburg, Ind.....	2 00
Second premium, Mrs. B. F. Jackson, Eminence, Ky.....	1 00
Cornish Indian hen, Wesley Lanins, Greensburg, Ind.....	2 00
Second premium, Mrs. B. F. Jackson, Eminence, Ky.....	1 00
Cornish Indian cockerel, Wesley Lanins, Greensburg, Ind.....	2 00
Second premium, B. F. Duncan, Greenfield, Ind.....	1 00
Cornish Indian pullet, C. E. Smith & Co., Ashley, Ohio.....	2 00
Second premium, Wesley Lanins, Greensburg, Ind.....	1 00
Red pile cock, Wesley Lanins, Greensburg, Ind.....	1 00
Second premium, Wesley Lanins, Greensburg, Ind.....	50
Red pile hen, Wesley Lanins, Greensburg, Ind.....	1 00
Second premium, Wesley Lanins, Greensburg, Ind.....	50

Red pile cockerel, Wesley Lanins, Greensburg, Ind.....	1 00
Red pile pullet, Wesley Lanins, Greensburg, Ind.....	1 00
Second premium, Wesley Lanins, Greensburg, Ind.....	50
White cock, J. A. Guilliams, Fincastle, Ind.....	1 00
Second premium, Grant R. Baxter, Hillsdale, Mich.....	50
White hen, J. A. Guilliams, Fincastle, Ind.....	1 00
Second premium, Grant R. Baxter, Hillsdale, Mich.....	50
White cockerel, J. A. Guilliams, Fincastle, Ind.....	1 00
Second premium, Grant R. Baxter, Hillsdale, Mich.....	50
White pullet, J. A. Guilliams, Fincastle, Ind.....	1 00
Second premium, J. A. Guilliams, Fincastle, Ind.....	50

LEGHORN.

White cock (S. C.), Jos. Haas, Indianapolis, Ind.....	2 00
Second premium, J. J. Burnside, Milligan, Ind.....	1 00
White hen (S. C.), J. J. Burnside, Milligan, Ind.....	2 00
Second premium, W. R. Zike & Son, Morristown, Ind.....	1 00
White cockerel (S. C.), William Tobin, Indianapolis, Ind.....	2 00
Second premium, William Tobin, Indianapolis, Ind.....	1 00
White pullet (S. C.), William Tobin, Indianapolis, Ind.....	2 00
Second premium, William Tobin, Indianapolis, Ind.....	1 00
White cock (R. C.), W. O. Swain, Manilla, Ind.....	2 00
Second premium, Grant R. Baxter, Hillsdale, Mich.....	1 00
White hen (R. C.), W. O. Swain, Manilla, Ind.....	2 00
Second premium, F. N. Smiley & Son, Milligan, Ind.....	1 00
White cockerel (R. C.), W. O. Swain, Manilla, Ind.....	2 00
Second premium, Grant R. Baxter, Hillsdale, Mich.....	1 00
White pullet (R. C.), W. O. Swain, Manilla, Ind.....	2 00
Second premium, W. O. Swain, Manilla, Ind.....	1 00
Brown cock (S. C.), J. J. Burnside, Milligan, Ind.....	2 00
Second premium, Smith & Winningham, Plumtree, Ind.....	1 00
Brown hen (S. C.), W. O. Swain, Manilla, Ind.....	2 00
Second premium, Miller & Trout, Garton, Ind.....	1 00
Brown cockerel, C. B. Lane, Spiceland, Ind.....	2 00
Second premium, C. B. Lane, Spiceland, Ind.....	1 00
Brown pullet (S. C.), C. B. Lane, Spiceland, Ind.....	2 00
Second premium, Miller & Trout, Garton, Ind.....	1 00
Brown cock (R. C.), C. R. Milhous, Indianapolis, Ind.....	2 00
Second premium, Peter Stohry, Shelbyville, Ind.....	1 00
Brown hen (R. C.), F. N. Smiley & Son, Milligan, Ind.....	2 00
Second premium, C. R. Milhous, Indianapolis, Ind.....	1 00
Brown cockerel (R. C.), C. R. Milhous, Indianapolis, Ind.....	2 00
Second premium, F. N. Smiley & Son, Milligan, Ind.....	1 00
Brown pullet (R. C.), C. R. Milhous, Indianapolis, Ind.....	2 00
Second premium, F. N. Smiley & Son, Milligan, Ind.....	1 00

Brown pullet (R. C.), C. R. Milhous, Indianapolis, Ind.....	2 00
Second premium, Peter Stohry, Shelbyville, Ind.....	1 00
Buff cock, Jos. Haas, Indianapolis, Ind.....	2 00
Second premium, Chas. McClave, New London, O.....	1 00
Buff hen, Chas. McClave, New London, O.....	2 00
Second premium, Jos. Haas, Indianapolis, Ind.....	1 00
Buff cockerel, E. C. Smith & Co., Ashley, O.....	2 00
Second premium, E. C. Smith & Co., Ashley, O.....	1 00
Buff pullet, F. E. Mow, Union Mills, Ind.....	2 00
Second premium, F. E. Mow, Union Mills, Ind.....	1 00
Black cock, Leonard Bros., Green, Ind.....	2 00
Second premium, W. R. Zike & Son, Morristown,* Ind.....	1 00
Black hen, W. R. Zike & Son, Morristown, Ind.....	2 00
Second premium, W. R. Zike & Son, Morristown, Ind.....	1 00
Black cockerel, Grant R. Baxter, Hillsdale, Mich.....	2 00
Black pullet, Grant R. Baxter, Hillsdale, Mich.....	2 00
Second premium, M. E. Bunker, Indianapolis, Ind.....	1 00

HOUDAN.

Cock, J. P. Baxla, Anthony, Ind.....	2 00
Second premium, C. E. Smith & Co., Ashley, O.....	1 00
Hen, C. E. Smith & Co., Ashley, O.....	2 00
Second premium, C. E. Smith & Co., Ashley, O.....	1 00
Cockerel, C. E. Smith & Co., Ashley, O.....	2 00
Second premium, C. E. Smith & Co., Ashley, O.....	1 00
Pullet, C. E. Smith & Co., Ashley, O.....	2 00
Second premium, C. E. Smith & Co., Ashley, O.....	1 00

BLACK SPANISH.

White-faced cock, G. A. Grassow, Indianapolis, Ind.....	2 00
Second premium, E. L. May, Indianapolis, Ind.....	1 00
White-faced hen, J. A. Horning, Sunman, Ind.....	2 00
Second premium, Seldensticker & Son, Brightwood, Ind.....	1 00
White-faced cockerel, J. A. Horning, Sunman, Ind.....	2 00
Second premium, Seldensticker & Son, Brightwood, Ind.....	1 00
White-faced pullet, J. A. Horning, Sunman, Ind.....	2 00
Second premium, Seldensticker & Son, Brightwood, Ind.....	1 00

MINORCAS.

Black cock, Chas. McClave, New London, O.....	2 00
Second premium, Ben Frick & Son, Loree, Ind.....	1 00
Black hen, Chas. McClave, New London, O.....	2 00
Second premium, A. E. Meredith, Indianapolis, Ind.....	1 00
Black cockerel, Chas. McClave, New London, O.....	2 00

Second premium, Chas. McClave, New London, O.....	1 00
Black pullet, Chas. McClave, New London, O.....	2 00
Second premium, Peter Stohry, Shelbyville, Ind.....	1 00

HAMBURG.

Golden-spangled cock, T. H. Buck, Morristown, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Golden-spangled hen, T. H. Buck, Morristown, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Golden-spangled cockerel, T. H. Buck, Morristown, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Golden-spangled pullet, T. H. Buck, Morristown, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Silver-spangled cock, F. N. Smiley & Son, Milligan, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Silver-spangled hen, T. H. Buck, Morristown, Ind.....	1 00
Second premium, Farber Bros., Sandyville, O.....	50
Silver-spangled cockerel, J. A. Horning, Sunman, Ind.....	1 00
Second premium, Sol D. Brandt, Logansport, Ind.....	50
Silver-spangled pullet, F. N. Smiley & Son, Milligan, Ind.....	1 00
Second premium, Sol D. Brandt, Logansport, Ind.....	50
Golden-pencilled hen or pullet, J. A. Horning, Sunman, Ind.....	1 00
Golden-pencilled cock or cockerel, J. A. Horning, Sunman, Ind.....	1 00
Second premium, J. A. Horning, Sunman, Ind.....	50

POLISH.

White-crested black cock, T. H. Buck, Morristown, Ind.....	1 00
Second premium, Chas. McClave, New London, O.....	50
White-crested black hen, J. A. Horning, Sunman, Ind.....	1 00
Second premium, J. A. Horning, Sunman, Ind.....	50
White-crested black cockerel, John L. Marsh, Brownsburg, Ind....	1 00
Second premium, J. A. Horning, Sunman, Ind.....	50
White-crested black hen, J. A. Horning, Sunman, Ind.....	1 00
Second premium, J. A. Horning, Sunman, Ind.....	50
Golden cock or cockerel, B. F. Duncan, Greenfield, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Golden hen or pullet, B. F. Duncan, Greenfield, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Silver cock, Farber Bros., Sandyville, Ind.....	1 00
Second premium, Winningham & Smith, Plumtree, Ind.....	50
Silver hen, Farber Bros., Sandyville, Ind.....	1 00
Second premium, Winningham & Smith, Plumtree, Ind.....	50
Silver cockerel, Winningham & Smith, Plumtree, Ind.....	1 00
Silver pullet, Winningham & Smith, Plumtree, Ind.....	1 00

JAVA.

Black cock, B. F. Duncan, Greenfield, Ind.....	1 00
Second premium, Winningham & Smith, Plumtree, Ind.....	50
Black cockerel, R. W. Williams, Indianapolis, Ind.....	1 00
Second premium, B. F. Duncan, Greenfield, Ind.....	50
Black hen, B. F. Duncan, Greenfield, Ind.....	1 00
Second premium, T. H. Buck, Morristown, Ind.....	50
Black pullet, B. F. Duncan, Greenfield, Ind.....	1 00
Second premium, R. W. Williams, Indianapolis, Ind.....	50

DORKING.

Silver gray cock, Winningham & Smith, Plumtree, Ind.....	1 00
Second premium, Winningham & Smith, Plumtree, Ind.....	50
Silver gray hen, Winningham & Smith, Plumtree, Ind.....	1 00
Second premium, Winningham & Smith, Plumtree, Ind.....	50
Silver gray cockerel, Winningham & Smith, Plumtree, Ind.....	1 00
Second premium, Winningham & Smith, Plumtree, Ind.....	50
Silver gray pullet, Winningham & Smith, Plumtree, Ind.....	1 00
Second premium, Winningham & Smith, Plumtree, Ind.....	50

RED CAPS.

Cock, Grant R. Baxter, Hillsdale, Mich.....	1 00•
Second premium, Chas. McClave, New London, O.....	50
Hen, Abe Reese, Bunker Hill, Ind.....	1 00
Second premium, Chas. McClave, New London, O.....	50
Cockerel, Chas. McClave, New London, O.....	1 00
Second premium, Abe Reese, Bunker Hill, Ind.....	50
Pullet, Chas. McClave, New London, O.....	1 00
Second premium, Chas. McClave, New London, O.....	50

BANTAMS—SEABRIGHTS.

Golden cock, Chas. McClave, New London, O.....	1 00
Second premium, Jones & Reeves, Clifford, Ind.....	50
Golden hen, Chas. McClave, New London, Ind.....	1 00
Second premium, Jones & Reeves, Clifford, Ind.....	50
Golden cockerel, Chas. McClave, New London, O.....	1 00
Second premium, E. L. May, Indianapolis, Ind.....	50
Golden pullet, Chas. McClave, New London, O.....	1 00
Second premium, Chas. McClave, New London, O.....	50
Silver cockerel or cock, J. A. Horning, Sunman, Ind.....	1 00
Second premium, J. A. Horning, Sunman, Ind.....	50
Silver hen or pullet, J. A. Horning, Sunman, Ind.....	1 00
Second premium, Grant R. Baxter, Hillsdale, Ind.....	50

Rose-crested black cock or cockerel, Grant R. Baxter, Hillsdale, Mich.	1 00
Second premium, Chas. McClave, New London, O.	50
Rose-crested black hen or pullet, Chas. McClave, New London, O.	1 00
Second premium, Grant R. Baxter, Hillsdale, Mich.	50

GAME BANTAMS.

Black-breasted red cock, Charles Clemans, Greensburg, Ind.	1 00
Second premium, J. A. Horning, Sunman, Ind.	50
Black-breasted red hen, Charles Clemans, Greensburg, Ind.	1 00
Second premium, J. A. Horning, Sunman, Ind.	50
Black-breasted red cockerel, Wesley Lanins, Greensburg, Ind.	1 00
Second premium, S. A. Nofztger, North Manchester, Ind.	50
Black-breasted red pullet, J. A. Horning, Sunman, Ind.	1 00
Second premium, Charles Clemans, Greensburg, Ind.	50
Silver duckwing cock, J. A. Horning, Sunman, Ind.	1 00
Second premium, Frank R. Hale, Shelbyville, Ind.	50
Silver duckwing hen, J. A. Horning, Sunman, Ind.	1 00
Second premium, Frank R. Hale, Shelbyville, Ind.	50
Silver duckwing cockerel, J. A. Horning, Sunman, Ind.	1 00
Second premium, Farber Bros., Sandyville, O.	50
Silver duckwing pullet, J. A. Horning, Sunman, Ind.	1 00
Second premium, J. A. Horning, Sunman, Ind.	50
Red pile cock, Charles Clemans, Greensburg, Ind.	1 00
Second premium, Grant R. Baxter, Hillsdale, Mich.	50
Red pile hen, Chas. McClave, New London, O.	1 00
Second premium, Grant R. Baxter, Hillsdale, Mich.	50
Red pile cockerel, Farber Bros., Sandyville, O.	1 00
Second premium, Charles Clemans, Hillsdale, Mich.	50
Red pile pullet, Charles Clemans, Hillsdale, Mich.	1 00
Second premium, Charles Clemans, Hillsdale, Mich.	50
Brown red cock, Grant R. Baxter, Hillsdale, Mich.	1 00
Second premium, Frank R. Hale, Shelbyville, Ind.	50
Red brown hen, Frank R. Hale, Shelbyville, Ind.	1 00
Second premium, Grant R. Baxter, Hillsdale, Mich.	50
Brown red cockerel, Frank R. Hale, Shelbyville, Ind.	1 00
Second premium, Farber Bros., Sandyville, O.	50
Brown red pullet, Frank R. Hale, Shelbyville, Ind.	1 00
Second premium, Farber Bros., Sandyville, O.	50

BUFF COCHIN BANTAMS.

Cock, W. R. Zike & Son, Morristown, Ind.	1 00
Second premium, W. R. Zike & Son, Morristown, Ind.	50
Hen, W. R. Zike & Son, Morristown, Ind.	1 00

Second premium, Clair F. Johnson, Rushville, Ind.....	50
Cockerel, Chas. McClave, New London, O.....	1 00
Second premium, Geo. M. Hoss, Indianapolis, Ind.....	50
Pullet, Chas. McClave, New London, O.....	1 00
Second premium, W. R. Zike & Son, Morristown, Ind.....	50

TURKEYS.

Bronze cock, B. F. Ulrey, Farmers' Institute, Ind.....	3 00
Second premium, Chas. McClave, New London, Ohio.....	2 00
Bronze hen, Chas. McClave, New London, O.....	3 00
Second premium, B. F. Ulrey, Farmers' Institute, Ind.....	2 00
Bronze cockerel, Chas. McClave, New London, O.....	3 00
Second premium, J. S. Smiley, Parkeville, Ind.....	2 00
Bronze pullet, B. F. Ulrey, Farmers' Institute, Ind.....	3 00
Second premium, Chas. McClave, New London, Ohio.....	2 00
White Holland cock, Samuel Gardiner, Fincastle, Ind.....	3 00
Second premium, Frank G. Hasselman, Indianapolis, Ind.....	2 00
White Holland hen, Samuel Gardiner, Fincastle, Ind.....	3 00
Second premium, J. P. Baxla, Anthony, Ind.....	2 00
White Holland cockerel, Samuel Gardiner, Fincastle, Ind.....	3 00
Second premium, Samuel Gardiner, Fincastle, Ind.....	2 00
White Holland pullet, Chas. McClave, New London, O.....	3 00
Second premium, Samuel Gardiner, Fincastle, Ind.....	2 00
Buff cock, Grant R. Baxter, Hillsdale, Mich.....	2 00
Buff hen, Grant R. Baxter, Hillsdale, Mich.....	2 00
Buff cockerel, Leonard Bros., Gem, Ind.....	2 00
Second premium, Grant R. Baxter, Hillsdale, Mich.....	1 00
Buff pullet, Leonard Bros., Gem, Ind.....	2 00
Second premium, Grant R. Baxter, Hillsdale, Mich.....	1 00

GEESE.

Pair Toulouse, old, J. A. Horning, Sunman, Ind.....	3 00
Second premium, Winningham & Smith, Plumtree, Ind.....	2 00
Pair Toulouse, young, F. W. Hiatt, Guilford, Ind.....	3 00
Second premium, F. N. Smiley & Son, Milligan, Ind.....	2 00
Pair Embden, old, L. B. Clore, Franklin, Ind.....	3 00
Second premium, Leonard Bros., Gem, Ind.....	2 00
Pair Embden, young, J. S. Smiley, Parkeville, Ind.....	3 00
Second premium, Chas. McClave, New London, Ohio.....	2 00
Pair Brown Chinese, old or young, Chas. McClave, New London, O.	2 00
Second premium, Winningham & Smith, Plumtree, Ind.....	1 00
Pair White Chinese, old or young, Chas. McClave, New London, O.	2 00
Second premium, Leonard Bros., Gem, Ind.....	1 00
Pair wild geese, Chas. McClave, New London, O.....	1 00

DUCKS.

Pair Pekin, old, C. E. Smith & Co., Ashley, O.....	3 00
Second premium, Chas. McClave, New London, O.....	2 00
Pair Pekin, young, F. W. Hiatt, Guilford, Ind.....	3 00
Second premium, Chas. McClave, New London, O.....	2 00
Pair Aylesbury, old or young, Chas. McClave, New London, O....	3 00
Pair Rouen, old, C. E. Smith & Co., Ashley, O.....	3 00
Second premium, Chas. McLave, New London, O.....	2 00
Pair Rouen, young, C. E. Smith & Co., Ashley, O.....	3 00
Second premium, Chas. McLave, New London, O.....	2 00

BREEDING PENS.

Light Brahmas, F. N. Smiley & Son, Milligan, Ind.....	10 00
Second premium, Chas. A. Snyder, Waynetown, Ind.....	5 00
Dark Brahmas, F. N. Smiley & Son, Milligan, Ind.....	5 00
Second premium, T. H. Buck, Morristown, Ind.....	3 00
Buff Cochins, Sid Conger, Hope, Ind.....	5 00
Second premium, Warbritton Bros., Ladoga, Ind.....	3 00
Partridge Cochins, Chas. McLave, New London, O.....	5 00
Second premium, C. E. Smith & Son., Ashley O.....	3 00
White Cochins, Warbritton Bros., Ladoga, Ind.....	5 00
Second premium, F. N. Smiley & Son, Milligan, Ind.....	3 00
Black Cochins, Louis Seidensticker & Son, Brightwood, Ind.....	5 00
Second premium, Warbritton Bros., Ladoga, Ind.....	3 00
Barred Plymouth Rock, Sid Conger, Hope, Ind.....	10 00
Second premium, Chas. McLave, New London, O.....	5 00
White Plymouth Rock, U. R. Fishel, Hope, Ind.....	5 00
Second premium, Sid Conger, Hope, Ind.....	3 00
Buff Plymouth Rock, F. E. Mow, Union Mills, Ind.....	5 00
Second premium, Mrs. E. J. Reynolds, Haskells, Ind.....	3 00
Buff Leghorn, F. E. Mow, Union Mills, Ind.....	5 00
Second Premium, C. E. Smith & Son, Ashley, O.....	3 00
Silver Wyandottes, Reeves & Jones, Clifford, Ind.....	5 00
Second premium, Chas. McLave, New London, O.....	3 00
Golden Wyandottes, C. E. Smith & Son, Ashley, O.....	5 00
Second premium, Chas. McLave, New London, O.....	3 00
White Wyandottes, Chas. McLave, New London, O.....	5 00
Second premium, Grant R. Baxter, Hillsdale, Mich.....	3 00
Black Langshans, Chas. A. Snyder, Waynetown, Ind.....	10 00
Second premium, Sid Conger, Hope, Ind.....	5 00
Red Cap, Chas. McLave, New London, O.....	4 00
Second premium, T. N. Buck, Morristown, Ind.....	2 00
Black-breasted Red Games, Wesley Lanus, Greensburg, Ind.....	4 00
Second premium, J. A. Guilleams, Fincastle, Ind.....	2 00

C. S. Indian Games, Wesley Lanins, Greensburg, Ind.....	4 00
Second premium, Mrs. B. F. Jackson, Eminence, Ky.....	2 00
Brown Leghorns, C. B. Lane, Spiceland, Ind.....	10 00
Second premium, Trout & Miller, Garton, Ind.....	5 00
White Leghorn, William Tobin, Indianapolis, Ind.....	5 00
Second premium, Jos. Haas, Indianapolis, Ind.....	3 00
Black Minorcas, Chas. McLave, New London, O.....	4 00
Second premium, Ben Frick & Son, Loree, Ind.....	2 00
Houdans, C. E. Smith & Co., Ashley, O.....	4 00
Second premium, J. P. Baxia, Anthony, Ind.....	2 00
White Black Spanish, J. A. Horning, Sunman, Ind.....	4 00
Second premium, Louis Seidensticker & Son, Brightwood, Ind.....	2 00
Silver-spangled Hamburgs, F. N. Smiley & Son, Milligan, Ind.....	4 00
Second premium, T. H. Buck, Morristown, Ind.....	2 00
White C. B. Polish, J. A. Horning, Sunman, Ind.....	4 00
Second premium, T. H. Buck, Morristown, Ind.....	2 00
Silver Polish, T. H. Buck, Morristown, Ind.....	4 00
Second premium, T. H. Buck, Morristown, Ind.....	2 00
Black-breasted Red Game Bantams, Chas. Clemens, Greensburg, Ind.	4 00
Second premium, J. A. Horning, Sunman, Ind.....	2 00
Silver Duckwing Game Bantams, J. A. Horning, Sunman, Ind....	2 00
Second premium, Reeves & Jones, Clifford, Ind.....	1 00
Golden Seabright Bantams, Chas. McLave, New London, O.....	2 00
Second premium, Reeves & Jones, Clifford, Ind.....	1 00
Buff Cochin Bantams, W. R. Zike & Son, Morristown, Ind.....	2 00
Second premium, Geo. M. Hoss, Indianapolis, Ind.....	1 00

Respectfully submitted,

COTT BARNETT,
Superintendent.

REPORT OF SUPERINTENDENT OF AGRICULTURE.

To the Delegate State Board of Agriculture:

It gives me great pleasure to submit to you my third annual report as Superintendent of Agricultural Hall. This has been one of the most successful years in the way of exhibits ever experienced in this department of the State Fair. The number of entries were much greater than ever before, and the quality of exhibits was never excelled. The hall was well filled, all the space being occupied by the exhibits. There is a manifest and increased interest shown in this department each year, and if continued under good management the building will soon not hold the prod-

ucts of the soil that are shown here. I would recommend that the walls of the building be celled up higher than they now are, and painted, as by so doing the exhibits will make a much better showing. The expense of the department for the last Fair is as follows: Robert Mitchell, judge, \$25.50; Ira B. Hurst, judge, \$15.00; Allen Robertson, assistant, \$27.00; total, \$67.50.

The following are the awards:

CLASS XXXVII—Grain and Seeds.

(Robert Mitchell, Judge.)

Half bushel orchard grass seed, J. L. Keckley, Marysville, O.	\$2 00
Half bushel Hungarian grass seed, J. L. Keckley, Marysville, O. . .	2 00
Second premium, I. B. Keckley, Marysville, O.	1 00
Half bushel Kentucky blue grass seed, J. L. Keckley, Marysville, O. .	2 00
Second premium, F. M. Whipps, Byhalia, O.	1 00
Half bushel English blue grass seed, J. L. Keckley, Marysville, O. .	2 00
Second premium, F. M. Whipps, Byhalia, O.	1 00
Half bushel lawn grass seed, John Marvel, Royalton, Ind.	2 00
Second premium, J. L. Keckley, Marysville, O.	1 00
Half bushel red clover seed, Dreston Van Gorden, Winterrowd, Ind.	2 00
Second premium, F. M. Whipps, Byhalia, O.	1 00
Half bushel English clover seed, Dreston Van Gorden, Winterrowd, Ind.	2 00
Second premium, F. M. Whipps, Byhalia, O.	1 00
Sample 10 lbs. broom corn, Dreston Van Gorden, Winterrowd, Ind. .	2 00
Second premium, William Ennis, Clermont, Ind.	1 00
Collection grain and seeds, J. L. Keckley, Marysville, O.	10 00
Second premium, F. M. Whipps, Byhalia, O.	5 00
Collection farm products, J. D. Whitesides, Franklin, Ind.	50 00
Second premium, John Marvel, Royalton, Ind.	25 00
Special prize, collection colored corn, L. B. Clore, Franklin, Ind. . .	

CLASS XXXVIII—Vegetables.

(Ira B. Hurst, Judge.)

Six egg plants, W. D. Whipps, Marion, O.	\$2 00
Second premium, F. M. Whipps, Byhalia, O.	1 00
Twelve cucumbers, Dreston Van Gorden, Winterrowd, Ind.	2 00
Second premium, J. D. Whitesides, Franklin, Ind.	1 00
Peck white beans, F. M. Whipps, Byhalia, O.	2 00

Second premium, F. M. Sanford, Philadelphia, Ind.....	1 00
Peck white navy beans, Dreston Van Gorden, Winterrowd, Ind...	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Peck Lima beans, Dreston Van Gorden, Winterrowd, Ind.....	2 00
Second premium, D. F. Ellwanger, Indianapolis, Ind.....	1 00
Peck white kidney beans, J. L. Keckley, Marysville, O.....	2 00
Second premium, Dreston Van Gorden, Franklin, Ind.....	1 00
Peck field peas, dry, J. L. Keckley, Marysville, O.....	2 00
Second premium, F. M. Whipps, Byhalla, O.....	1 00
Peck garden peas, dry, F. M. Whipps, Byhalla, O.....	2 00
Second premium, Dreston Van Gorden, Winterrowd, Ind.....	1 00
Peck peppers for pickling, F. M. Whipps, Byhalla, O.....	2 00
Second premium, C. B. Clore, Franklin, Ind.....	1 00
Peck tomatoes, Harry Bennet, Indianapolis, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Collection tomatoes, D. F. Ellwanger, Indianapolis, Ind.....	3 00
Second premium, C. E. Becker, Mapleton, Ind.....	2 00
Dozen ears green sweet corn, C. E. Becker, Mapleton, Ind.....	2 00
Second premium, D. T. Ellwanger, Indianapolis, Ind.....	1 00
Dozen ears of dry sweet corn, J. D. Whitesides, Franklin, Ind....	2 00
Second premium, John Marvel, Royalton, Ind.....	1 00
Three Hubbard squashes, F. M. Whipps, Byhalla, O.....	2 00
Second premium, W. D. Whipps, Marion, O.....	1 00
Three Marblehead squashes, F. M. Whipps, Byhalla, O.....	2 00
Second premium, J. L. Keckley, Marion, O.....	1 00
Three Crookneck squashes, J. L. Keckley, Marion, O.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Three California squashes, F. M. Whipps, Byhalla, O.....	2 00
Second premium, J. L. Keckley, Marion, O.....	1 00
Largest pumpkin, J. L. Keckley, Marion, O.....	2 00
Second premium, Harry Bennet, Indianapolis, Ind.....	1 00
Three field pumpkins, W. H. Hoss, Indianapolis, Ind.....	2 00
Second premium, Harry Bennet, Indianapolis, Ind.....	1 00
Largest squashes, Sylvester Johnson, Irvington, Ind.....	2 00
Second premium, F. M. Sanford, Philadelphia, Ind.....	1 00
Six Drumhead cabbage, D. F. Ellwanger, Indianapolis, Ind.....	2 00
Second premium, C. E. Becker, Mapleton, Ind.....	1 00
Six flat Dutch cabbages, D. F. Ellwanger, Indianapolis, Ind.....	2 00
Second premium, John Marvel, Royalton, Ind.....	1 00
Six head cabbage, any kind, D. F. Ellwanger, Indianapolis, Ind....	2 00
Second premium, F. M. Whipps, Byhalla, Ind.....	1 00
Dozen stalks celery, D. F. Ellwanger, Indianapolis, Ind.....	2 00
Second premium, C. E. Becker, Mapleton, Ind.....	1 00
Display celery, D. F. Ellwanger, Indianapolis, Ind.....	3 00
Second premium, C. E. Becker, Mapleton, Ind.....	2 00

Collection vegetables, D. F. Ellwanger, Indianapolis, Ind.....	10 00
Second premium, C. E. Becker, Mapleton, Ind.....	5 00
Six watermelons, J. S. Duckwall, Indianapolis, Ind.....	3 00
Second premium, D. F. Ellwanger, Indianapolis, Ind.....	2 00
Six nutmeg melons, D. F. Ellwanger, Indianapolis, Ind.....	3 00
Second premium, C. E. Becker, Mapleton, Ind.....	2 00
Gypsy melon, J. S. Duckwall, Indianapolis, Ind.....	2 00
Second premium, D. F. Ellwanger, Indianapolis, Ind.....	1 00
Icing melon, J. S. Duckwall, Indianapolis, Ind.....	2 00
Second premium, D. F. Ellwanger, Indianapolis, Ind.....	1 00
Sweetheart melon, J. S. Duckwall, Indianapolis, Ind.....	2 00
Second premium, C. E. Becker, Mapleton, Ind.....	1 00
Display of muskmelons, D. F. Ellwanger, Indianapolis, Ind.....	3 00
Second premium, C. E. Becker, Mapleton, Ind.....	2 00
Collection melons, all kinds, D. F. Ellwanger, Indianapolis, Ind...	5 00

CLASS XXXIX—Root Crops.

(Ira B. Hurst, Judge.)

Peck turnips, D. F. Ellwanger, Indianapolis, Ind.....	\$2 00
Second premium, F. M. Whipps, Byhalia, O.....	1 00
Peck parsnips, C. E. Becker, Mapleton, Ind.....	2 00
Second premium, D. F. Ellwanger, Indianapolis, Ind.....	1 00
Peck carrots for stock, L. B. Clore, Franklin, Ind.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Peck carrots for table, W. D. Whipps, Marion, O.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Dozen roots salsify, F. M. Whipps, Byhalia, O.....	2 00
Second premium J. D. Whitesides, Franklin, Ind.....	1 00
Dozen horseradish, F. M. Whipps, Byhalia, O.....	2 00
Second premium, D. F. Ellwanger, Indianapolis, Ind.....	1 00
Dozen long red beets, J. D. Whitesides, Franklin, Ind.....	2 00
Second premium, John Marvel, Royalton, Ind.....	1 00
Dozen turnip beets, F. M. Whipps, Byhalia, O.....	2 00
Second premium, C. E. Becker, Mapleton, Ind.....	1 00
Dozen sugar beets, John Marvel, Royalton, Ind.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Display sugar beets, J. L. Keckley, Marysville, O.....	3 00
Second premium, J. D. Whitesides, Franklin, Ind.....	2 00
Dozen mangel-wurzel beets, W. D. Whipps, Marion, O.....	2 00
Second premium, John Marvel, Royalton, Ind.....	1 00
Peck red onions, F. M. Whipps, Byhalia, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00

Peck yellow onions, J. L. Keckley, Marysville, O.....	2 00
Second premium, F. M. Whipps, Byhalla, O.....	1 00
Peck white onions, F. M. Whipps, Byhalla, O.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Gallon white onion sets, C. E. Becker, Mapleton, Ind.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Gallon yellow onion sets, D. F. Ellwanger, Indianapolis, Ind.....	2 00
Second premium, C. E. Becker, Mapleton, Ind.....	1 00
Display onions, D. F. Ellwanger, Indianapolis, Ind.....	3 00
Second premium, C. E. Becker, Mapleton, Ind.....	2 00
Dozen turnip radishes, J. D. Whitesides, Franklin, Ind.....	1 00
Second premium, J. D. Whitesides, Franklin, Ind.....	50
Dozen long radishes, J. D. Whitesides, Franklin, Ind.....	1 00
Second premium, John Marvel, Royalton, Ind.....	50
Dozen radishes any other kind, C. E. Becker, Mapleton, Ind.....	1 00
Second premium, D. F. Ellwanger, Indianapolis, Ind.....	50
Collection of root crops, D. F. Ellwanger, Indianapolis, Ind.....	5 00
Second premium, C. E. Becker, Mapleton, Ind.....	3 00

CLASS XI.—Potatoes.

(Ira B. Hurst, Judge.)

Peck Early Rose, J. D. Whitesides, Franklin, Ind.....	\$2 00
Second premium, F. M. Whipps, Byhalla, O.....	1 00
Peck Early Ohio, J. D. Whitesides, Franklin, Ind.....	2 00
Second premium, J. L. Keckley, Marysville, O.....	1 00
Peck Beauty of Hebron, J. L. Keckley, Marysville, O.....	2 00
Second premium, W. O. Swain, Manilla, Ind.....	1 00
Peck Burbank Seedling, F. M. Whipps, Byhalla, O.....	2 00
Second premium, J. S. Keckley, Marysville, O.....	1 00
Peck Green Mountain, F. M. Whipps, Byhalla, O.....	2 00
Second premium, J. S. Keckley, Marysville, O.....	1 00
Peck Bliss Triumphs, J. S. Keckley, Marysville, O.....	2 00
Second premium, W. O. Swain, Manilla, Ind.....	1 00
Peck White Star, W. O. Swain, Manilla, Ind.....	2 00
Peck World's Fair, J. S. Keckley, Marysville, O.....	2 00
Second premium, J. A. Hevenridge, Whitley, Ind.....	1 00
Peck Carmen No. 1, F. M. Whipps, Byhalla, O.....	2 00
Second premium, J. S. Keckley, Marysville, O.....	1 00
Peck New Queen, J. S. Keckley, Marysville, O.....	2 00
Second premium, J. R. Weaver, Middletown, Ind.....	1 00
Peck Maggie Murphy, W. O. Swain, Manilla, Ind.....	2 00
Second premium, J. R. Weaver, Middletown, Ind.....	1 00
Peck Early Harvest, F. M. Whipps, Byhalla, O.....	2 00

Second premium, J. S. Keckley, Marysville, O.....	1 00
Peck of any other kind, F. M. Whipps, Byhalia, O.....	2 00
Second premium, J. D. Whitesides, Franklin, Ind.....	1 00
Collection Irish, J. S. Keckley, Marysville, O.....	10 00
Second premium, L. B. Clore, Franklin, Ind.....	5 00
Peck yellow sweet, D. F. Ellwanger, Indianapolis, Ind.....	2 00
Second premium, C. E. Becker, Mapleton, Ind.....	1 00
Peck red sweet, C. E. Becker, Mapleton, Ind.....	2 00
Second premium, D. F. Ellwanger, Indianapolis, Ind.....	1 00
Collection of sweet, D. F. Ellwanger, Indianapolis, Ind.....	5 00
Second premium, C. E. Becker, Mapleton, Ind.....	3 00

Respectfully submitted,

JOHN L. DAVIS,
Superintendent.

REPORT OF SUPERINTENDENT OF HORTICULTURE.

To the Delegate State Board of Agriculture:

Gentlemen—In the horticultural department the exhibit was good in all of the classes, except in the bees and honey exhibit. Notwithstanding the shortage in the apple crop of 1898, the exhibit was very creditable.

The exhibit of pears, peaches and grapes being exceptionally large and complete, the competition in the county exhibits was sharp, and the exhibits were meritorious in every respect.

In the floral department we had one of the most magnificent exhibits of recent years. The Indianapolis florists, who were not with us the year before, were competitors in all of the classes in which they were eligible, and the exhibit was one of great credit to them. The cut flowers and special designs elicited a great deal of comment and admiration from the visitors to this department.

We would recommend a third premium in the original designs, as it will increase and have a tendency to continue this feature of the exhibit.

I would also thank my assistants for the very courteous manner in which they conducted their several departments.

The expenses of the department were \$102.46, as follows:

Theodore Bock, judge	\$18 00
H. M. Dunlap, judge	17 26
Mrs. L. D. Robison, assistant	15 00
J. L. Dunning, assistant	33 60
S. O. Dungan, assistant	15 00
Alice M. Compton, services	3 60

Following are the awards:

CLASS XLI--Fruits.

(H. M. Dunlap, Judge.)

APPLES.

Fifteen varieties for home use, C. M. Counter, Toledo, O.....	\$10 00
Ten varieties for market, C. M. Counter, Toledo, O.....	8 00
Second premium, C. P. Bradley, South Bend, Ind.....	5 00
Five varieties for culinary use, C. M. Counter, Toledo, O.....	4 00
Second premium, C. P. Bradley, South Bend, Ind.....	2 00
Plate Maiden Blush, C. M. Counter, Toledo, O.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Smith Cider, Evan Swift, Franklin, Ind.....	1 50
Second premium, J. M. Daubenspeck, Mattsville, Ind.....	1 00
Plate Ben Davis, Joe A. Burton, Orleans, Ind.....	1 50
Second premium, J. M. Daubenspeck, Mattsville, Ind.....	1 00
Plate Rome Beauty, Joe A. Burton, Orleans, Ind.....	1 50
Second premium, C. E. Counter, Toledo, O.....	1 00
Plate wine sap, Joe A. Burton, Orleans, Ind.....	1 50
Second premium, J. Y. Damree, Bud, Ind.....	1 00
Plate Rambo, Evan Swift, Franklin, Ind.....	1 50
Plate Yellow Bellflower, J. Y. Damree, Bud, Ind.....	1 50
Plate Fallawater, J. C. Grossman, Wolcottville, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Fall Pippin, C. M. Counter, Toledo, Ind.....	1 50
Plate Wagener, C. M. Counter, Toledo, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Gravenstein, C. M. Counter, Toledo, O.....	1 50
Plate Fameuse or Snow, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Hubbardston, C. P. Bradley, South Bend, Ind.....	1 50
Plate Peck Wilson, C. P. Bradley, South Bend, Ind.....	1 50
Plate Rhode Island Greening, C. M. Counter, Toledo, O.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Clayton, L. Llewellyn, Ripple, Ind.....	1 50
Second premium, J. Y. Damree, Bud, Ind.....	1 00
Plate White Pippin, J. Y. Damree, Bud, Ind.....	1 50
Second premium, L. Llewellyn, Ripple, Ind.....	1 00
Plate Baldwin, J. C. Grossman, Wolcottville, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Plate York Imperial, Evan Swift, Franklin, Ind.....	1 50
Plate Northern Spy, N. E. Woods, Pecksburg, Ind.....	1 50

Second premium, N. E. Woods, Pecksburg, Ind.....	1 00
Plate Grimes' Golden, Joe A. Burton, Orleans, Ind.....	1 50
Second premium, Evan Swift, Franklin, Ind.....	1 00
Plate Roman Stem, C. P. Bradley, South Bend, Ind.....	1 50
Plate Indiana Favorite, J. M. Daubenspeck, Mattsville, Ind.....	1 50
Plate Jonathan, N. E. Woods, Pecksburg, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Vandevere, B. F. Cole, Trafalgar, Ind.....	1 50
Second premium, Evan Swift, Franklin, Ind.....	1 00
Plate Ralls' Genet, Joe A. Burton, Orleans, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Plate Wealthy, Evan Swift, Franklin, Ind.....	1 50
Second premium, B. F. Cole, Trafalgar, Ind.....	1 00
Plate Pewaukee, Evan Swift, Franklin, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate English Russet, C. P. Bradley, South Bend, Ind.....	1 50

CRAB APPLES.

Plate Hyssop, L. Llewellyn, Ripple, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 50
Plate Transcendent, C. P. Bradley, South Bend, Ind.....	1 50

PEARS.

Collection eight varieties for family use, C. M. Counter, Toledo, O.	8 00
Second premium, H. H. Swain, South Bend, Ind.....	5 00
Six varieties for market, H. H. Swain, South Bend, Ind.....	5 00
Second premium, C. P. Bradley, South Bend, Ind.....	3 00
Plate Bartlett, J. C. Grossman, Wolcottville, Ind.....	1 50
Second premium, H. H. Swain, South Bend, Ind.....	1 00
Plate Clapp Favorite, John Marvel, Royalton, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Anjou, C. P. Bradley, South Bend, Ind.....	1 50
Angouleme, W. D. Whipps, Marion, O.....	1 50
Second premium, W. D. Whipps, Marion, O.....	1 00
Plate Flemish Beauty, H. H. Swain, South Bend, Ind.....	1 50
Second premium, Mrs. Mary J. Flick, Lawrence, Ind.....	1 00
Plate Howell, C. M. Counter, Toledo, O.....	1 50
Second premium, Mrs. Mary J. Flick, Lawrence, Ind.....	1 00
Plate Kiefer, J. M. Daubenspeck, Mattsville, Ind.....	1 50
Second premium, Evan Swift, Franklin, Ind.....	1 00
Plate Louis Ben, C. M. Counter, Toledo, O.....	1 50
Second premium, Leonard Bros., Gem, Ind.....	1 00
Plate Sheldon, H. H. Swain, South Bend, Ind.....	1 50

Second premium, W. D. Whipps, Marion, O.....	1 00
Plate Seckel, J. C. Grossman, Wolcottville, Ind.....	1 50
Second premium, Henry J. Hale, Haughville, Ind.....	1 00
Plate Lawrence, C. M. Counter, Toledo, O.....	1 50
Second premium, J. M. Daubenspeck, Mattsville, Ind.....	1 00
Plate Winternells, H. H. Swain, South Bend, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Vicar, H. H. Swain, South Bend, Ind.....	1 50
Second premium, Roy Hindman, Lawrence, Ind.....	1 00

PEACHES.

Six varieties for any use, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, Mrs. Mary J. Flick, Lawrence, Ind.....	1 00
Three varieties for market, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, Mrs. Mary J. Flick, Lawrence, Ind.....	1 00
Plate Clings, John Marvel, Royalton, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Free Stone, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, Mrs. Mary J. Flick, Lawrence, Ind.....	1 00

QUINCES.

Collection of not less than three varieties, Mrs. Mary J. Flick, Lawrence, Ind.	1 50
Plate Orange, J. C. Grossman, Wolcottville, Ind.....	1 50
Second premium, Mrs. Mary J. Flick, Lawrence, Ind.....	1 00
Plate Meeche's Prolific, J. C. Grossman, Wolcottville, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Champion, J. C. Grossman, Wolcottville, Ind.....	1 50
Second premium, Mrs. Mary J. Flick, Lawrence, Ind.....	1 00
Plate Missouri Mammoth, W. M. Dawson, Broad Ripple, Ind....	1 50
Second premium, L. Llewellyn, Ripple, Ind.....	1 00

PLUMS.

Collection of native, Sylvester Johnson, Irvington, Ind.....	2 00
Second premium, J. M. Daubenspeck, Mattsville, Ind.....	1 00
Collection European, C. P. Bradley, South Bend, Ind.....	2 00
Plate native, Sylvester Johnson, Irvington, Ind.....	1 50
Second premium, John Marvel, Royalton, Ind.....	1 00
Plate European, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, John Marvel, Royalton, Ind.....	1 00
Japanese, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, John Marvel, Royalton, Ind.....	1 00

GRAPES.

Ten varieties for family use, C. P. Bradley, South Bend, Ind.....	5 00
Second premium, John Marvel, Royalton, Ind.....	2 50
Six varieties for market use, C. P. Bradley, South Bend, Ind.....	3 00
Second premium, H. H. Swain, South Bend, Ind.....	1 50
Five cluster, any kind, C. P. Bradley, South Bend, Ind.....	2 00
Second premium, C. A. Saltmarsh, Seymour, Ind.....	1 00
Plate Worden, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, H. H. Swain, South Bend, Ind.....	1 00
Plate Concord, H. H. Swain, South Bend, Ind.....	1 50
Second premium, J. C. Grossman, Wolcottville, Ind.....	1 00
Plate Wilder, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, Sylvester Johnson, Irvington, Ind.....	1 00
Plate Duchess, Sylvester Johnson, Irvington, Ind.....	1 50
Second premium, C. A. Saltmarsh, Seymour, Ind.....	1 00
Plate Brighton, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, A. F. Bergman, Logansport, Ind.....	1 00
Plate Salem, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, C. A. Saltmarsh, Seymour, Ind.....	1 00
Plate Lindley, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, Sylvester Johnson, Irvington, Ind.....	1 00
Plate Pocklington, C. P. Bradley, South Bend, Ind.....	1 50
Second premium, Mrs. Mary Richardson, Howland, Ind.....	1 00
Plate Niagara, H. H. Swain, South Bend, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate Moore's Diamond, H. H. Swain, South Bend, Ind.....	1 50
Second premium, Sylvester Johnson, Irvington, Ind.....	1 00
Plate hothouse grapes, Sylvester Johnson, Irvington, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00
Plate seedling, E. Y. Teas, Irvington, Ind.....	1 50

MISCELLANEOUS.

Plate persimmons, Evan Swift, Franklin, Ind.....	1 50
Second premium, Mrs. Mary J. Flick, Lawrence, Ind.....	1 00
Plate papaws, Roy Hindman, Lawrence, Ind.....	1 50
Second premium, F. M. Sanford, Philadelphia, Ind.....	1 00
Plate Vergennes, Sylvester Johnson, Irvington, Ind.....	1 50
Second premium, C. P. Bradley, South Bend, Ind.....	1 00

SWEEPSTAKES.

Display of fruits, H. C. Weaver, Shelbyville, Ind.....	50 00
Second premium, St. Joseph County Horticultural Society.....	30 00
Third premium, Evan Swift, Franklin, Ind.....	20 00

Display of fruits, flowers, vegetables, cereals and grasses, Fred Dickson, Lawrence, Ind.....	16 00
Second premium, Irma Berterman, Indianapolis, Ind.....	12 00
Third premium, Roy Hindman, Lawrence, Ind.....	8 00

CLASS XLII—Flowers.

(Theo. Bock, Judge.)

PLANTS.

Ten palms, Berterman Floral Co., Indianapolis, Ind.....	\$10 00
Twenty ferns and lycopodiums, Berterman Floral Co., Indianapolis, Ind.....	15 00
Second premium, A. Wiegand, Indianapolis, Ind.....	10 00
Ten crotons, A. Wiegand, Indianapolis, Ind.....	7 00
Second premium, Berterman Floral Co., Indianapolis, Ind.....	4 00
Twenty variegated show plants, Berterman Floral Co., Indianapolis, Ind.....	10 00
Second premium, A. Wiegand, Indianapolis, Ind.....	7 00
Ten cannas, second premium, Berterman Floral Co., Indianapolis, Ind.	7 00
Ten blooming begonias, Berterman Floral Co., Indianapolis, Ind...	6 00
Ten foliage begonias, Berterman Floral Co., Indianapolis, Ind....	7 00
Six geraniums in bloom, second premium, Berterman Floral Co., Indianapolis, Ind.....	3 00
Two vases filled A. Wiegand, Indianapolis, Ind.....	8 00
Second premium, Berterman Floral Co., Indianapolis, Ind.....	5 00

SPECIAL.

Display and arrangement show, A. Wiegand, Indianapolis, Ind....	35 00
Second premium, Berterman Floral Co., Indianapolis, Ind.....	25 00
Two floral arrangements, Berterman Floral Co., Indianapolis, Ind.	25 00
Second premium, John Rieman, Indianapolis, Ind.....	15 00
Two baskets, John Rieman, Indianapolis, Ind.....	15 00
Second premium, Berterman Floral Co., Indianapolis, Ind.....	10 00
Three bouquets, Berterman Floral Co., Indianapolis, Ind.....	10 00
Second premium, E. H. Schmidt, Indianapolis, Ind.....	6 00
Collection of cut flowers, W. W. Coles, Kokomo, Ind.....	10 00
Second premium, Berterman Floral Co., Indianapolis, Ind.....	6 00
Collection of dahlias, Berterman Floral Co., Indianapolis, Ind....	5 00
Second premium, E. H. Schmidt, Indianapolis, Ind.....	3 00

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Collection of cut gladioli, W. W. Cole, Kokomo, Ind.....	15 00
Second premium, Berterman Floral Co., Indianapolis, Ind.....	10 00
Original show of flowers, Berterman Floral Co., Indianapolis, Ind.....	50 00
Second premium, John Rieman, Indianapolis, Ind.....	35 00
Original arrangement of flowers, Berterman Floral Co., Indianapolis, Ind.	25 00
Second premium, John Rieman, Indianapolis, Ind.....	15 00

CLASS XLIII—Flowers.

(Theo. Bock, Judge.)

AMATEUR.

Collection of begonias, Mrs. Frank P. Johnson, Howland, Ind.....	\$5 00
Second premium, Mrs. Mary Flick, Lawrence, Ind.....	3 00
Collection of climbers, second premium, Mrs. Mary Flick, Lawrence, Ind.	2 00
Three hanging baskets, Mrs. Mary Flick, Lawrence, Ind.....	3 00

CUT FLOWERS.

Collection of geraniums, Mrs. P. D. Stagg, Greensburg, Ind.....	3 00
Second premium, Mrs. Mary Flick, Lawrence, Ind.....	2 00
Collection of roses, Mrs. P. D. Stagg, Greensburg, Ind.....	4 00
Collection of verbenas, Mrs. P. D. Stagg, Greensburg, Ind.....	3 00
Second premium, Mrs. E. T. Akass, Indianapolis, Ind.....	2 00
Collection dahlias, Jessie Tyer, Indianapolis, Ind.....	3 00
Second premium, Mrs. E. T. Akass, Indianapolis, Ind.....	2 00
Collection of gladiolas, Jesse Tyer, Indianapolis, Ind.....	3 00
Second premium, Mrs. P. D. Stagg, Greensburg, Ind.....	3 00
Design of cut flowers, Mrs. E. T. Akass, Indianapolis, Ind.....	8 00
Second premium, Jessie Tyer, Indianapolis, Ind.....	4 00
Dozen carnations, Jessie Tyer, Indianapolis, Ind.....	3 00
Second premium, Mrs. P. D. Stagg, Greensburg, Ind.....	2 00
Dozen bouquets, Jesse Tyer, Indianapolis, Ind.....	4 00
Second premium, Mrs. Mary Flick, Lawrence, Ind.....	2 00

E. A. ROBISON,
Superintendent.

REPORT OF THE SUPERINTENDENT OF THE FINE ARTS DEPARTMENT.

To the President and Members of the Delegate Board of the Indiana State Board of Agriculture:

Gentlemen—I beg leave to submit the following report as Superintendent of the Fine Arts Department for the meeting of 1898:

The exhibit in this department was one of the largest and most comprehensive in the history of the State Fair. The premium list as amended, adding many new articles, gave excellent satisfaction and added much to the interest in the display. The character of the display was much improved over former years, many articles of exceptional merit being shown in the several departments.

The changes made in the interior of the building and the general arrangement of the display made it much more satisfactory to all concerned, but it added somewhat to the expense on account of the additional work required in the arrangement and care of the displays.

The night display and the (incident) opening of the fine arts department until 8:30 o'clock made it necessary to increase the force of assistant superintendents, so as to insure the proper care of the displays.

I would recommend a change in the interior arrangement of the fine arts building that would allow a more satisfactory and safe display of the valuable articles that are placed on exhibition. Proper and suitable cases should be provided so that all articles be protected from the dust and rain as well as from the attempts at theft.

The expense of the department was \$426.75.

Following are the awards:

CLASS XLV—Knitting and Crochet Work.

(Mrs. F. W. Zimmerman, Judge.)

Infant's skirt, Anna Miller, Quincy, Ill.....	\$1 50
Second premium, Mrs. C. Dille, Greensburg, Ind.....	75
Infant's sock display, Mrs. M. A. Payne, Palmyra, Mo.....	1 50
Second premium, Mrs. Wm. Schaffer, Indianapolis, Ind.....	75
Pair silk mittens, Maud C. Hinsey, Pekin, Ill.....	1 50
Second premium, Mrs. M. A. Payne, Palmyra, Mo.....	75
Pair silk stockings, Mrs. M. A. Payne, Palmyra, Mo.....	2 00
Second premium, Anna Miller, Quincy, Ill.....	1 00
Pair fancy woolen stockings, Mrs. M. A. Payne, Palmyra, Mo....	1 50
Second premium, Mrs. P. D. Stagg, Greensburg, Ind.....	75

Infant's crochet sacque, Mrs. R. H. Talbutt, Lexington, Ky.....	1 50
Second premium, Anna Miller, Quincy, Ill.....	75
Couch cover, Mrs. L. E. Rockwell, Quincy, Ill.....	2 00
Second premium, Anna Miller, Quincy, Ill.....	1 00
Crochet skirt, Mrs. G. A. McLeod, Cincinnati, O.....	2 00
Second premium, Mrs. J. Lynch, Kokomo, Ind.....	1 00
Child's crochet skirt, Mrs. P. D. Stagg, Greensburg, Ind.....	1 50
Second premium, Mrs. C. Dille, Greensburg, Ind.....	75
Silk purse, Mrs. Wm. Welch, Indianapolis, Ind.....	1 50
Crochet spread, Mrs. L. E. Rockwell, Quincy, Ill.....	2 00
Infant's silk cap, Mrs. M. A. Payne, Palmyra, Mo.....	1 50
Second premium, Mrs. L. E. Rockwell, Quincy, Ill.....	75

CLASS XLVI—Lace Work.

(Mrs. F. W. Zimmerman, Judge.)

Battenburg specimen, Mrs. C. C. Burns, Greensburg, Ind.....	\$1 50
Second premium, Mrs. B. F. Jackson, Eminence, Ky.....	1 00
Battenburg dresser scarf, Mrs. C. C. Burns, Greensburg, Ind.....	1 50
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00
Battenburg table cover, Mrs. C. C. Burns, Greensburg, Ind.....	1 50
Second premium, Mrs. Mary A. Phipps, Indianapolis, Ind.....	1 00
Battenburg centerpiece, Mrs. L. A. Moore, Terre Haute, Ind.....	1 50
Second premium, Maud C. Hinsey, Pekin, Ill.....	1 00
Battenburg tidy, Mrs. Mary A. Phipps, Indianapolis, Ind.....	1 50
Second premium, Mary J. Lynch, Kokomo, Ind.....	1 00
Battenburg sideboard scarf, Mrs. C. C. Burns, Greensburg, Ind.....	1 50
Second premium, Mrs. W. S. Hoss, Indianapolis, Ind.....	1 00
Battenburg display, Mrs. H. Jeffry, Franklin, Ind.....	2 00
Second premium, Mrs. R. H. Behymer, Irvington, Ind.....	1 00
Point lace display, Mrs. E. J. Chance, Alpine, Ind.....	3 00
Second premium, Ella Bottorff, Corydon, Ind.....	1 50
Point lace specimen, Mrs. L. E. Rockwell, Quincy, Ill.....	2 00
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00
Point lace handkerchief, Maud C. Hinsey, Pekin, Ill.....	2 00
Second premium, Mrs. R. H. Talbutt, Lexington, Ky.....	1 00
Bed set, Mrs. C. C. Burns, Greensburg, Ind.....	3 00
Second premium, Mrs. Mary Flick, Lawrence, Ind.....	2 00

CLASS XLVII—Embroidery, Hand-Made.

(Mrs. E. P. Thayer, Judge.)

Delft, Mrs. R. H. Talbott, Lexington, Ky.....	\$2 00
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00
Jewel, Mrs. Julia C. Walk, Indianapolis, Ind.....	2 00

Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00
Castlestitch, Mrs. Leibhardt, Knightstown, Ind.....	2 00
Second premium, Mrs. Allen Sammons, Michigan City, Ind.....	1 00
Egyptian, Mrs. H. S. Murdock, Logansport, Ind.....	2 00
Second premium, Mrs. J. A. McLeod, Cincinnati, O.....	1 00
Cut glass, Anna Miller, Quincy, Ill.....	2 00
Second premium, Mrs. R. H. Behymer, Irvington, Ind.....	1 00
Honiton, Mrs. J. E. Rockwell, Quincy, Ill.....	2 00
Second premium, Ella Boteroff, Corydon, Ind.....	1 00
Cotton, Mrs. J. Leibhardt, Knightstown, Ind.....	2 00
Second premium, Mrs. H. D. Field, Greensburg, Ind.....	1 00
Kensington, Mrs. R. H. Talbott, Lexington, Ky.....	2 00
Second premium, Maud C. Hinsey, Pekin, Ill.....	1 00
Rope silk, Mrs. L. A. Moore, Terre Haute, Ind.....	2 00
Second premium, Mrs. E. Buck, Lockland, O.....	1 00
Roman, Mrs. L. A. Moore, Terre Haute, Ind.....	2 00
Second premium, Maud C. Hinsey, Pekin, Ill.....	1 00
Sorrento, Mrs. M. A. Payne, Palmyra, Mo.....	2 00
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00
Outline, Mrs. L. A. Moore, Terre Haute, Ind.....	1 50
Second premium, Mrs. H. S. Murdock, Logansport, Ind.....	75
Embroidery on bolting cloth, Mrs. J. J. Garver, Indianapolis, Ind..	2 00
Second premium, Mrs. Julia C. Walk, Indianapolis, Ind.....	1 00
Embroidery on chamols, Mrs. H. L. Sperry, Indianapolis, Ind.....	2 00
Second premium, Mrs. J. J. Garver, Indianapolis, Ind.....	1 00
Queen Ann darning, Mrs. Allen, Sammons, Michigan City, Ind....	2 00
Second premium, Mrs. M. A. Payne, Palmyra, Mo.....	1 00
Etching silk specimen, Mrs. R. H. Talbott, Lexington, Ky.....	2 00
Second premium, Mrs. M. A. Payne, Palmyra, Mo.....	1 00
Denim specimen, Mrs. L. E. Rockwell, Quincy, Ill.....	1 50
Second premium, Mrs. L. L. Douglass, Indianapolis, Ind.....	75
Basket or molle cloth, Anna Miller, Quincy, Ill.....	1 50
Second premium, Maud C. Hinsey, Pekin, Ill.....	75
High art needle work specimen, Jeanette Monroe.....	2 00
Second premium, Mrs. L. E. Rockwell, Quincy, Ill.....	1 00
Tinting and embroidery, Mrs. P. D. Stagg, Greensburg, Ind.....	1 50
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	75
Lunch set, Mrs. H. S. Murdock, Logansport, Ind.....	3 00
Second premium, Mrs. R. H. Talbott, Lexington, Ky.....	2 00
Dolly set, Mrs. H. L. Sperry, Indianapolis, Ind.....	2 00
Second premium, Mrs. C. Dille, Greensburg, Ind.....	1 00
Linen table cloth and six napkins, Mrs. C. Dille, Greensburg, Ind.	3 00
Second premium, Mrs. H. D. Field, Greensburg, Ind.....	2 00
Hostess cloth, R. H. Behymer, Irvington, Ind.....	2 00
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00

Tray cloth, Mrs. L. A. Moore, Terre Haute, Ind.....	1 50
Second premium, Mrs. John Sparr, Indianapolis, Ind.....	75
Handkerchief, Mrs. P. D. Stagg, Greensburg, Ind.....	1 50
Second premium, Mrs. C. Dille, Greensburg, Ind.....	75
Skirt silk embroidery, Maud C. Hinsey, Pekin, Ill.....	2 00
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	1 00
Infant's shawl, silk embroidery, Mrs. J. Leibhardt, Knightstown, Ind.	2 00
Second premium, Maud C. Hinsey, Pekin, Ill.....	1 00
Infant's cap, silk embroidery, Mrs. C. Dille, Greensburg, Ind.....	1 50
Second premium, Anna Miller, Quincy, Ill.....	75
Table scarf, Mrs. H. L. Sperry, Indianapolis, Ind.....	2 00
Second premium, Mrs. R. H. Talbott, Lexington Ky.....	1 00
Sideboard scarf, Mrs. L. A. Moore, Terre Haute, Ind.....	2 00
Second premium, Mrs. E. Buck, Lockland, O.....	1 00
Piano scarf, Mrs. C. Dille, Greensburg, Ind.....	2 00
Second premium, Mrs. H. L. Sperry, Indianapolis, Ind.....	1 00
Dresser furnishings, Mrs. E. Buck, Lockland, O.....	1 50
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	75
Couch pillow, Mrs. Julia C. Walk, Indianapolis, Ind.....	2 00
Second premium, Maud C. Hinsey, Pekin, Ill.....	1 00
Toilet cushion, Mrs. E. Buck, Lockland, Ind.....	1 50
Second premium, Mrs. C. Dille, Greensburg, Ind.....	75
Table cover, Mrs. R. H. Talbott, Lexington, Ky.....	2 00
Second premium, Mrs. H. L. Sperry, Indianapolis, Ind.....	1 00
Table center embroidery, Mrs. R. H. Talbott, Lexington, Ky.....	2 00
Second premium, Mrs. Mary A. Phipps, Indianapolis, Ind.....	1 00
Pair towels, linen embroidery, Mrs. L. A. Moore, Terre Haute, Ind.	2 00
Second premium, Mrs. H. D. Fields, Greensburg, Ind.....	1 00
Handkerchief satchel, Mrs. H. S. Murdock, Logansport, Ind.....	1 50
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	75
Glove satchel, Mrs. H. S. Murdock, Logansport, Ind.....	1 50
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	75
Tea cosey, Mrs. P. D. Stagg, Greensburg, Ind.....	1 50
Second premium, Mrs. C. Dille, Greensburg, Ind.....	75
Five o'clock tea, Mrs. H. S. Murdock, Logansport, Ind.....	1 50
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	75
Picture frame embroidery, Mrs. H. S. Murdock, Logansport, Ind..	1 50
Second premium, Mrs. H. L. Sperry, Indianapolis, Ind.....	75
Bulgarian work, Mrs. J. J. Garver, Indianapolis, Ind.....	1 50
Second premium, Mrs. Celia E. Luke, Palmyra, Mo.....	75
Carnation work, Mrs. C. Dille, Greensburg, Ind.....	1 50
Second premium, Mrs. M. Krueger, Indianapolis, Ind.....	75

CLASS XLVIII—Machine Work.

(Mrs. E. P. Thayer, Judge.)

Ladies' white skirt, Mrs. P. D. Stagg, Greensburg, Ind.....	\$1 50
Second premium, Mrs. J. Leiboldt, Knightstown, Ind.....	75
Display ladies' underwear, Mrs. J. A. McLeod, Cincinnati, Ohio...	3 00
Second premium, Mrs. C. C. Burns, Greensburg, Ind.....	1 50
Hemstitching, Francis A. Cummings, Indianapolis, Ind.....	1 50
Second premium, Francis A. Cummings, Indianapolis, Ind.....	75
Hemstitching child's dress, May Faught, Indianapolis, Ind.....	1 50
Second premium, Mrs. C. C. Burns, Greensburg, Ind.....	75
High art machine work, Mrs. C. C. Dille, Greensburg, Ind.....	2 00
Second premium, Mrs. L. E. Rockwell, Quincy, Ill.....	1 00
Table cover, Mrs. Allen Sammons, Michigan City, Ind.....	75
Handkerchief, Francis A. Cummings, Indianapolis, Ind.....	1 50
Second premium, Mrs. M. A. Payne, Palmyra, Mo.....	75
Ladies' tea jacket, Mrs. E. Buck, Lockland, Ohio.....	1 50
Second premium, Mrs. Allen Sammons, Michigan City, Ind.....	75

HAND WORK.

Hemstitching towels, Anna Miller, Quincy, Ill.....	1 50
Second premium, Mrs. C. C. Burns, Greensburg, Ind.....	75
Hemstitching sheets and pillow cases, Mrs. C. C. Burns, Greensburg, Ind.....	2 00
Second premium, Mrs. W. S. Hoss, Indianapolis, Ind.....	1 00
Hemstitching child's dress, Mary J. Lynch, Kokomo, Ind.....	2 00
Second premium, Louise Tutwiler, Indianapolis, Ind.....	1 00
Drawn work, Anna Miller, Quincy, Ill.....	1 50
Second premium, Louise Tutwiler, Indianapolis, Ind.....	75
Drawn work, Persian, Mrs. L. A. Moore, Terre Haute, Ind.....	2 00
Second premium, Mrs. Allen Sammons, Michigan City.....	1 00
Drawn work, Mexican, Mrs. M. E. Bunker, Indianapolis, Ind.....	2 00
Second premium, Mrs. M. A. Payne, Palmyra, Mo.....	1 00
Infant's outfit, most sensible, Mrs. H. D. Fields, Greensburg, Ind.	4 00
Second premium, Mrs. C. Dille, Greensburg, Ind.....	2 00
Infant's dress, Louise Tutwiler, Indianapolis, Ind.....	2 00
Second premium, Mrs. C. Dille, Greensburg, Ind.....	1 00
Ladies' white skirt, Mrs. C. Dille, Greensburg, Ind.....	2 00
Second premium, Mrs. M. A. Payne, Palmyra, Mo.....	1 00
Suit ladies' underwear, with hand-made lace, Mrs. G. A. McLeod, Cincinnati, Ohio	2 00
Second premium, Ella Botteroff, Corydon, Ind.....	1 00

CLASS XLIX—Ladies' Fancy Work.

(Mrs. W. R. Goodwin, Judge.)

Handkerchief satchel, not embroidered, Mrs. M. E. Saunders, Terre Haute, Ind.....	\$1 50
Second premium, Mrs. Chas. B. Western, Jackson, Mich.....	75
Glove satchel, not embroidered, Mrs. M. E. Saunders, Terre Haute, Ind.	1 50
Second premium, Mrs. J. Leibhardt, Knightstown, Ind.....	75
Toilet cushion, Mrs. Allen Sammons, Michigan City.....	1 50
Second premium, Mrs. H. L. Sperry, Indianapolis, Ind.....	75
Couch pillow, most sensible, Mary J. Lynch, Kokomo, Ind.....	1 50
Second premium, Mrs. C. Dille, Greensburg, Ind.....	75
Infant's nursery basket, Louise Tutwiler, Indianapolis, Ind.....	2 00
Second premium, Mrs. H. B. Roney, Indianapolis, Ind.....	1 00
Infant's afghan, embroidered, Anna Miller, Quincy, Ill.....	1 50
Second premium, Maud C. Hinsey, Pekin, Ill.....	75
Rug, Anna Miller, Quincy, Ill.....	1 50
Second premium, Mrs. L. E. Rockwell, Quincy, Ill.....	75
Book cover, Mrs. H. L. Sperry, Indianapolis, Ind.....	1 50
Second premium, Mrs. C. W. Vance, Paris, Ill.....	75
Lunch set, not embroidery, Mrs. M. E. Bunker, Indianapolis, Ind..	2 00
Second premium, Anna Miller, Quincy, Ill.....	1 00
Doilies, not embroidery, Mrs. L. C. Harris, Cincinnati, Ohio.....	1 50
Second premium, Anna Miller, Quincy, Ill.....	75
Head rest, Mrs. L. L. Daugless, Indianapolis, Ind.....	1 50
Second premium, Maud C. Hinsey, Pekin, Ill.....	75
Reticule, Mrs. L. A. Moore, Terre Haute, Ind.....	1 50
Second premium, Mrs. Wm. Welch, Indianapolis, Ind.....	75
Fancy apron, Mrs. C. Dille, Greensburg, Ind.....	1 50
Second premium, Mrs. H. S. Murdock, Logansport, Ind.....	75
Kitchen apron, most useful, Mrs. C. Dille, Greensburg, Ind.....	1 50
Second premium, Mrs. G. A. McLoed, Cincinnati, Ohio.....	75
Housewife, Mrs. P. D. Stagg, Greensburg, Ind.....	1 50
Second premium, Miss Anna Brydon, Indianapolis, Ind.....	75
Table cover, Mrs. Allen Sammons, Michigan City, Ind.....	1 50
Second premium, Mrs. L. A. Moore, Terre Haute, Ind.....	75
Table center, Mrs. H. L. Sperry, Indianapolis, Ind.....	1 50
Second premium, Mrs. L. E. Rockwell, Quincy, Ill.....	75
Fancy opera bag, Mrs. H. L. Sperry, Indianapolis, Ind.....	1 50
Second premium, Mrs. J. Leibhardt, Knightstown, Ind.....	75
Laundry bag, Mrs. H. S. Murdock, Logansport, Ind.....	1 50
Second premium, Mrs. L. A. Moor, Terre Haute, Ind.....	75

Darning or dust bag, Mrs. Bunker, Indianapolis, Ind.....	1 50
Second premium, May Thornberry, Indianapolis, Ind.....	75
Lamp shade, Mrs. T. M. Carriger, Indianapolis, Ind.....	1 50
Second premium, Mrs. L. C. Harris, Cincinnati, Ohio.....	75
Table mats, fancy, Mrs. M. E. Bunker, Indianapolis, Ind.....	1 50
Second premium, Mrs. E. Buck, Lockland, Ohio.....	75
Quilt silk needle work, Mrs. R. H. Talbott, Lexington, Ky.....	2 00
Second premium, Anna Miller, Quincy, Ill.....	1 00
Crazy quilt, Mrs. J. J. Garver, Indianapolis, Ind.....	2 00
Second premium, Mrs. L. Dochez.....	1 00

CLASS I.—Decorative Art.

(Mrs. W. F. Zimmerman, Judge.)

Decorative art work, Mrs. L. C. Harris, Cincinnati, Ohio.....	\$2 00
Hammered or repousse, Mrs. D. B. Teyeneck, Indianapolis, Ind...	1 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	4 00
Molding in clay, Miss Helen Goodwin, New Castle, Ind.....	2 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	2 00
Carved or incision, Minnie B. Akass, Indianapolis, Ind.....	3 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	2 00
Bas-relief, Minnie B. Akass, Indianapolis, Ind.....	4 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	2 00
Wood carving display, Mrs. Ben Booth, Indianapolis, Ind.....	8 00
Second premium, Mrs. Mary A. Phipps, Indianapolis, Ind.....	4 00
Wood carving specimen, Lena L. Ingraham, Indianapolis, Ind....	4 00
Second premium, L. Dochez, Indianapolis, Ind.....	2 00
Painting on bolting cloth, Mrs. L. C. Harris, Cincinnati, Ohio.....	2 00
Second premium, Miss Helen Goodwin, New Castle, Ind.....	1 00
Painting on chamols skin, Minnie B. Akass, Indianapolis, Ind.....	2 00
Second premium, Mrs. C. W. Vance, Paris, Ill.....	1 00
Painting on matting, Minnie B. Akass, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	1 00
Tapestry painting, Anna Knubbe, Indianapolis, Ind.....	5 00
Second premium, Anna Knubbe, Indianapolis, Ind.....	3 00
Display painted menu cards, Minnie B. Akass, Indianapolis, Ind..	5 00
Second premium, Anna Knubbe, Indianapolis, Ind.....	3 00
Blotting pad, Grace Greenleaf, Indianapolis, Ind.....	2 00
Second premium, Mrs. Mary A. Phipps, Indianapolis, Ind.....	1 00
Calendar, Mrs. M. B. Grubbs, Crawfordsville, Ind.....	2 00
Second premium, Grace Greenleaf, Indianapolis, Ind.....	1 00
Letter case, Minnie B. Akass, Indianapolis, Ind.....	2 00
Second premium, Mrs. M. I. Jullan, Indianapolis, Ind.....	1 00

Visiting list, Grace Greenleaf, Indianapolis, Ind.	2 00
Second premium, Mrs. G. A. McLoed, Cincinnati, Ohio.	1 00
Photograph frame, Anna Knubbe, Indianapolis, Ind.	2 00
Second premium, Mrs. H. B. Roney, Indianapolis, Ind.	1 00
Painted fire screen, mounted, Mrs. H. B. Roney, Indianapolis, Ind.	4 00
Second premium, Miss Margaret Shover, Indianapolis, Ind.	2 00
Photograph display, Earnest C. Morris, Indianapolis, Ind.	5 00
Second premium, Estelle Fithian, Indianapolis, Ind.	3 00
Photograph specimen, Estelle Fithian, Indianapolis, Ind.	4 00
Second premium, Lois L. Hoyt, Indianapolis, Ind.	2 00
Collection of articles, Mrs. E. J. Chance, Alpine, Ind.	4 00
Second premium, Mrs. M. I. Julian, Indianapolis, Ind.	2 00
Bonbon, Mrs. Mary A. Phipps, Kokomo, Ind.	3 00
Second premium, Mrs. Wm. Welch, Indianapolis, Ind.	2 00
Decorated tray, Mrs. E. J. Chance, Alpine, Ind.	2 00
Second premium, Mrs. E. P. Thayer, Greenfield, Ind.	1 00
Tapestry ceiling pieces, Minnie B. Akass, Indianapolis, Ind.	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.	2 00
Tapestry hall decoration, Minnie B. Akass, Indianapolis, Ind.	3 00
Second premium, Daisy Altland, Indianapolis, Ind.	2 00

CLASS LI—Art, Amateur.

(Mrs. W. R. Goodwin, Judge.)

Portrait in oil, from life, Minnie B. Akass, Indianapolis, Ind.	\$10 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.	5 00
Portrait in crayon, from life, Minnie B. Akass, Indianapolis, Ind. .	4 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.	2 00
Portrait in pastel, from life, Mrs. Clinton Hall, Indianapolis, Ind. .	4 00
Second premium, James Ritchey, Indianapolis, Ind.	2 00
Portrait in water colors, life, Minnie B. Akass, Indianapolis, Ind. .	6 00
Second premium, James Ritchey, Indianapolis, Ind.	3 00
Ideal head, in oil, Minnie B. Akass, Indianapolis, Ind.	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.	1 00
Ideal head, crayon, Minnie B. Akass, Indianapolis, Ind.	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.	1 00
Ideal head, in water color, May Greenleaf, Indianapolis, Ind.	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.	1 00
Ideal figure, in oil, Minnie B. Akass, Indianapolis, Ind.	2 00
Second premium, Mrs. G. A. McLoed, Cincinnati, Ohio.	1 00
Ideal figure, in crayon, Albert B. Schloer, Trenton, New Jersey. . .	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.	1 00
Ideal figure, in water color, Mrs. Clinton Hall, Indianapolis, Ind. .	2 00

Second premium, Lella Galpin, Indianapolis, Ind.....	1 00
Display flowers, in oil, copy, Daisy Altland, Indianapolis, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen flowers, in oil, original, Minnie B. Akass, Indianapolis, Ind.	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Display flowers, in oil, Mrs. Clinton Hall, Indianapolis, Ind.....	4 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	2 00
Specimen flowers, water color, copy, Grace Greenleaf, Indianapolis, Ind.	2 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	1 00
Specimen flowers, water color, original, Minnie B. Akass, Indianapolis, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Display flowers, water color, Minnie B. Akass, Indianapolis, Ind..	4 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Specimen of fruit or vegetable, in oil, copy, Minnie B. Akass, Indianapolis, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen fruit or vegetable, in water color, copy, Mrs. S. E. Leet, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	1 00
Specimen fruit or vegetables, in oil, original, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	1 00
Specimen fruit or vegetable, in water color, original, Gertrude May, Indianapolis, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Display of fruit or vegetables, in oil, Minnie B. Akass, Indianapolis, Ind.....	4 00
Second premium, display fruit or vegetable, in water color, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	2 00
Specimen animal, in oil, copy, Mrs. Clinton Hall, Indianapolis, Ind.	2 00
Second premium, Miss Margaret B. Shover, Indianapolis, Ind....	1 00
Specimen animal, water color, copy, Miss Helen Goodwin, New Castle, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen painting, game, oil, Minnie B. Akass, Indianapolis, Ind..	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Specimen painting, game, in water color, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	1 00
Specimen painting, game, pastel, Mrs. Clinton Hall, Indianapolis, Ind.	2 00

Second premium, in oil, Albert B. Schloer, Trenton, New Jersey...	1 00
Painting animal, in oil, life, Minnie B. Akass, Indianapolis, Ind...	4 00
Second premium, Belle Morgan, Indianapolis, Ind.....	2 00
Painting, animal, water color, life, Minnie B. Akass, Indianapolis, Ind.	4 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Painting, still life, oil, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	1 00
Painting, still life, water color, Mrs. Clinton, Hall, Indianapolis, Ind.	2 00
Second premium, Gertrude May, Indianapolis, Ind.....	1 00
Painting, still life, pastel, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Albert Schloer, Trenton, New Jersey.....	1 00
Painting, landscape, oil, Minnie B. Akass, Indianapolis, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Painting, landscape, water color, Mrs. Clinton Hall, Indianapolis, Ind.	2 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	1 00
Painting, landscape, pastel, Mrs. Clinton Hall, Indianapolis, Ind..	2 00
Second premium, M. E. Saunders, Terre Haute, Ind.....	1 00
Display landscape paintings. Minnie B. Akass, Indianapolis, Ind..	4 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Sketch, nature, oil, Minnie B. Akass, Indianapolis, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Sketch, nature, water color, Minnie B. Akass, Indianapolis, Ind..	2 00
Second premium, Gertrude May, Indianapolis, Ind.....	1 00
Sketch, nature, crayon, Mrs. L. E. Rockwell, Quincy, Ill.....	2 00
Second premium, Mrs. H. C. Roney, Indianapolis, Ind.....	1 00
Sketch, nature, pastel, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Mrs. H. C. Roney, Indianapolis, Ind.....	1 00
Spring scene, oil, Mrs. W. A. Cox, Mooresville, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Spring scene, water color, Gertrude May, Indianapolis, Ind.....	2 00
Second premium, Florence Smith, Indianapolis, Ind.....	1 00
Summer scene, oil, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	1 00
Summer scene, water color, Minnie Akass, Indianapolis, Ind.....	2 00
Second premium, Mrs. G. A. McLeod, Cincinnati, Ohio.....	1 00
Autumn scene, oil, Minnie Akass, Indianapolis, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Autumn scene, water color, Mrs. Clinton Hall, Indianapolis, Ind...	2 00
Second premium, Mrs. G. A. McLeod, Cincinnati, Ohio.....	1 00
Winter scene, oil, Minnie Akass, Indianapolis, Ind.....	2 00
Second premium, Bell Morgan, Indianapolis, Ind.....	1 00
Winter scene, water color, Mrs. Clinton Hall, Indianapolis, Ind....	2 00

Second premium, Minnie B. Akass, Indianapolis, Ind.....	1 00
Marine scene, oil, Mrs. Clinton Hall, Indianapolis, Ind.....	2 00
Second premium, Minnie B. Akass, Indianapolis, Ind.....	1 00
Marine scene, water color, Grace Greenleaf, Indianapolis, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Interior scene, figure, oil, Minnie Akass, Indianapolis, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Interior scene, figure, water color, Mrs. Clinton Hall, Indianapolis, Ind.	2 00
Second premium, May Greenleaf, Indianapolis, Ind.....	1 00
Specimen pen and ink sketch, Albert Schloer, Trenton, New Jersey	2 00
Second premium, Albert Schloer, Trenton, New Jersey.....	1 00
Display, pen and ink sketch, Mrs. Fremont Eastes, Mt. Comfort, Ind.	4 00
Second premium, Lena Ingraham, Indianapolis, Ind.....	2 00
Specimen drawing, copy, Minnie Akass, Indianapolis, Ind.....	2 00
Second premium, Grace Greenleaf, Indianapolis, Ind.....	1 00
Specimen drawing, original, Minnie Akass, Indianapolis, Ind.....	2 00
Second premium, Lena Ingraham, Indianapolis, Ind.....	1 00
Display drawings, copy, Minnie Akass, Indianapolis, Ind.....	2 00
Second premium, Mrs. Clinton Hall, Indianapolis, Ind.....	1 00
Display drawings, original, Minnie Akass, Indianapolis, Ind.....	4 00
Second premium, Mrs. J. E. Haffner, Muncie, Ind.....	2 00
Specimen drawing, head and figure, Mrs. Clinton Hall, Indian- apolis, Ind.....	2 00
Second premium, Minnie Akass, Indianapolis, Ind.....	1 00
Outline map of Indiana, Minnie Akass, Indianapolis, Ind.....	2 00
Second premium, Mrs. G. A. McLeod, Cincinnati, Ohio.....	1 00
Outline map of U. S.....	2 00
Second premium, Minnie Akass, Indianapolis, Ind.....	1 00
Drawing, architectural, original, Lena Ingraham, Indianapolis, Ind.	2 00
Second premium, Mrs. J. E. Haffner, Muncie, Ind.....	1 00
Drawing, mechanical, H. C. Westfall, Terre Haute, Ind.....	2 00
Second premium, H. C. Westfall, Terre Haute, Ind.....	1 00
Drawing, charcoal, antique, display, Lena Ingraham, Indianapolis, Ind.	2 00
Second premium, Miss Helen Goodwin, New Castle, Ind.....	1 00
Painting on china, Dresden, specimen, Mrs. J. J. Garver, New Castle, Ind.....	2 00
Second premium, Miss Coughlin, Indianapolis, Ind.....	1 00
Painting on china, display, Mrs. E. P. Thayer, Greenfield, Ind....	4 00
Second premium, Mrs. W. L. Fugate, Indianapolis, Ind.....	2 00
Painting on china, royal Worcester, specimen, Mrs. W. L. Fugate, Indianapolis, Ind.....	2 00
Second premium, Daisy Altland, Indianapolis, Ind.....	1 00

Painting on china, clock.....	2 00
Second premium, Kathrine Venn, Indianapolis, Ind.....	1 00
Painting on china, relief gold, Mrs. E. P. Thayer, Greenfield, Ind..	2 00
Second premium, Mrs. W. L. Fugate, Indianapolis, Ind.....	1 00
Painting on china, enamel, Mrs. J. J. Garver, Indianapolis, Ind....	2 00
Second premium, Mrs. W. L. Fugate, Indianapolis, Ind.....	1 00
Painting on china, punch bowl, Mrs. Chas. Ferst, Indianapolis, Ind.	4 00
Second premium, Kathrine Venn, Indianapolis, Ind.....	2 00
Painting on china, ornamental display, Mrs. E. P. Thayer, Green- field, Ind.....	4 00
Second premium, Myrtle Taylor, Indianapolis, Ind.....	2 00
Painting on china, original flower design, display, Mrs. E. P. Thayer, Greenfield, Ind.....	4 00
Second premium, Mrs. W. L. Fugate, Indianapolis, Ind.....	2 00
Painting on china, Doulton, specimen, Mrs. W. L. Fugate, Indian- apolis, Ind.....	4 00
Second premium, Mrs. J. J. Garver, Indianapolis, Ind.....	2 00
Painting on china, fruit set, compote and plates, Mrs. Von Horn..	4 00
Second premium, Mrs. W. L. Fugate, Indianapolis, Ind.....	2 00
China chocolate set, Etha May Hall, Indianapolis, Ind.....	4 00
Second premium, Kathrine Venn, Indianapolis, Ind.....	2 00
China soup bowl, Miss Coughlin, Indianapolis, Ind.....	4 00
Second premium, Mrs. E. P. Thayer, Greenfield, Ind.....	2 00
China tea set, M. E. Saunders, Terre Haute, Ind.....	4 00
Second premium, Mrs. W. L. Fugate, Indianapolis, Ind.....	2 00
China pudding set, Etha May Hall, Indianapolis, Ind.....	4 00
Second premium, Mrs. W. L. Fugate, Indianapolis, Ind.....	2 00
China manicure, Mrs. W. L. Fugate, Indianapolis, Ind.....	4 00
Second premium, C. Carrlager, Indianapolis, Ind.....	2 00
China ice cream set, Mrs. E. P. Thayer, Greenfield, Ind.....	4 00
Second premium, Mrs. W. L. Fugate, Indianapolis, Ind.....	2 00
China jardiniere, Mrs. J. J. Garver, Indianapolis, Ind.....	4 00
Second premium, Miss Coughlin, Indianapolis, Ind.....	2 00
Ideal head, china or porcelain, Myrtle Taylor, Indianapolis, Ind...	2 00
Second premium, Mrs. E. P. Thayer, Greenfield, Ind.....	1 00
Ideal figure, china or porcelain, Mrs. J. J. Garver, Indianapolis, Ind.	2 00
Second premium, Mrs. J. J. Garver, Indianapolis, Ind.....	1 00
Painting on china, portrait.....	
Second premium, Mrs. Van Horn.....	2 00

CLASS LII—Art, Professional.

Portrait, oil, Mrs. E. M. Ingraham, Indianapolis, Ind.....	\$15 00
Second premium, Minnie Akass, Indianapolis, Ind.....	8 00
Portrait, water color, H. W. Barnitz, Urbana, O.....	10 00

Second premium, Anna Knubbe, Indianapolis, Ind.....	5 00
Portrait, crayon, Minnie Akass, Indianapolis, Ind.....	6 00
Second premium, H. W. Barnitz, Urbana, O.....	3 00
Portrait, pastel, Mrs. Marie Folger, Indianapolis, Ind.....	10 00
Second premium, Maud Hinsey, Pekin, Ill.....	5 00
Ideal head, oil, not china, Minnie Hines, Indianapolis, Ind.....	6 00
Second premium, Minnie Akass, Indianapolis, Ind.....	3 00
Ideal head, water color, Anna Knubbe, Indianapolis, Ind.....	4 00
Second premium, Mrs. John Sparr, Indianapolis, Ind.....	2 00
Ideal figure, oil, not china, Minnie Akass, Indianapolis, Ind.....	6 00
Second premium, Gwynne C. Price, Chicago, Ill.....	3 00
Ideal figure, water color, Mrs. E. M. Ingraham, Indianapolis, Ind.....	4 00
Second premium, Gwynne C. Price, Chicago, Ill.....	2 00
Specimen flowers, oil, Minnie Akass, Indianapolis, Ind.....	4 00
Second premium, Anna Knubbe, Indianapolis, Ind.....	2 00
Display flowers, oil, Minnie Akass, Indianapolis, Ind.....	6 00
Second premium, Mrs. E. M. Ingraham, Indianapolis, Ind.....	3 00
Specimen flowers, water color, Imogene Brown, Crawfordsville, Ind.	4 00
Second premium, Imogene Brown, Crawfordsville, Ind.....	2 00
Display flowers, water color, Mrs. John Sparr, Indianapolis, Ind...	6 00
Second premium, Mrs. E. M. Ingraham, Indianapolis, Ind.....	3 00
Specimen fruit or vegetables, oil, Mrs. John Sparr, Indianapolis, Ind.	4 00
Second premium, Mrs. E. M. Ingraham, Indianapolis, Ind.....	2 00
Specimen fruit or vegetables, water color, Mrs. E. M. Ingraham, Indianapolis, Ind.	4 00
Second premium, M. E. Grubb, Crawfordsville, Ind.....	2 00
Display of fruit or vegetables, oil, Mrs. E. M. Ingraham, Indian- apolis, Ind.....	4 00
Second premium, Mrs. John Sparr, Indianapolis, Ind.....	3 00
Display fruit or vegetables, water color, Minnie Akass, Indian- apolis, Ind.	4 00
Second premium, Mrs. E. M. Ingraham, Indianapolis, Ind.....	3 00
Animal, oil, Minnie Hines, Indianapolis, Ind.....	4 00
Second premium, Mrs. John Sparr, Indianapolis, Ind.....	2 00
Animal, water color, Minnie Akass, Indianapolis, Ind.....	4 00
Second premium, Mrs. John Sparr, Indianapolis, Ind.....	2 00
Game piece, oil, Mrs. John Sparr, Indianapolis, Ind.....	4 00
Second premium, Mrs. Marie Folger, Indianapolis, Ind.....	2 00
Game piece, water color, second premium, Mrs. John Sparr, Indi- anapolis, Ind.....	2 00
Game piece, pastel, Mrs. W. L. Fugate, Indianapolis, Ind.....	4 00
Still life, oil, Mrs. Marie Folger, Indianapolis, Ind.....	4 00
Second premium, M. B. Grubb, Crawfordsville, Ind.....	2 00

Still life, water color, Imogene Brown, Crawfordsville, Ind.....	4 00
Second premium, Mrs. John Sparr, Indianapolis, Ind.....	2 00
Still life, pastel, Mrs. W. L. Fugate, Indianapolis, Ind.....	4 00
Second premium, Mrs. Marie Folger, Indianapolis, Ind.....	2 00
Specimen landscape, oil, Minnie Akass, Indianapolis, Ind.....	4 00
Second premium, H. W. Barnitz, Urbana, O.....	2 00
Specimen landscape, water color, Minnie Akass, Indianapolis, Ind.	4 00
Second premium, Mrs. L. C. Harris, Cincinnati, O.....	2 00
Specimen landscape, pastel, Mrs. L. C. Harris, Cincinnati, O.....	4 00
Second premium, Mrs. W. L. Fugate, Indianapolis, Ind.....	2 00
Display landscape paintings, Minnie Akass, Indianapolis, Ind....	6 00
Second premium, H. W. Barnitz, Urbana, O.....	3 00
Sketch, nature, oil, Minnie Akass, Indianapolis, Ind.....	4 00
Second premium, M. B. Grubb, Crawfordsville, Ind.....	3 00
Sketch, nature, water color, Imogene Brown, Crawfordsville, Ind.	4 00
Second premium, Mrs. L. C. Harris, Cincinnati, O.....	2 00
Sketch, nature, pastel, Mrs. John Sparr, Indianapolis, Ind.....	4 00
Second premium, Mrs. L. C. Harris, Cincinnati, O.....	2 00
Sketch, nature, crayon, Minnie Akass, Indianapolis, Ind.....	4 00
Second premium, Minnie Hines, Indianapolis, Ind.....	2 00
Display, sketch, nature, Mrs. John Sparr, Indianapolis, Ind.....	6 00
Second premium, Minnie Akass, Indianapolis, Ind.....	3 00
Interior scene, figure, oil, Minnie Akass, Indianapolis, Ind.....	4 00
Second premium, H. W. Barnitz, Urbana, O.....	2 00
Drawing, antique head, Mrs. John Sparr, Indianapolis, Ind.....	4 00
Second premium, Mrs. John Sparr, Indianapolis, Ind.....	2 00
Drawing, antique figure, Mrs. John Sparr, Indianapolis, Ind.....	4 00
Second premium, Minnie Hines, Indianapolis, Ind.....	2 00
Drawing, animal, Minnie Akass, Indianapolis, Ind.....	4 00
Second premium, Mrs. John Sparr, Indianapolis, Ind.....	2 00
Drawing, architectural, Mrs. E. M. Ingraham, Indianapolis, Ind..	4 00
Second premium, Mrs. J. E. Haffner, Muncie, Ind.....	2 00
Drawing, mechanical, Mrs. E. M. Ingraham, Indianapolis, Ind....	4 00
Second premium, H. C. Westfall, Terre Haute, Ind.....	2 00
Pen and ink drawings, Pink Hall, Indianapolis, Ind.....	4 00
Second premium, Mrs. E. M. Ingraham, Indianapolis, Ind.....	2 00
Wash drawing, Minnie Akass, Indianapolis, Ind.....	4 00
Second premium, H. W. Barnitz, Urbana, O.....	2 00
Charcoal drawing, life, Imogene Brown, Crawfordsville, Ind....	3 00
Second premium, Lena Ingraham, Indianapolis, Ind.....	2 00
Illustrated poem, Mrs. John Sparr, Indianapolis, Ind.....	8 00
Second premium, Minnie Akass, Indianapolis, Ind.....	4 00
Painting, china, flower plates, Mrs. Laura Davis, Columbus, O...	3 00
Second premium, Mrs. M. I. Julian, Indianapolis, Ind.....	2 00
China, Dresden specimen, Mrs. M. I. Julian, Indianapolis, Ind....	4 00

Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
China display, Mrs. M. I. Julian, Indianapolis, Ind.....	4 00
Second premium, Mrs. Wm. Welch, Indianapolis, Ind.....	2 00
China, royal Worcester specimen, Mrs. M. I. Julian, Indianapolis, Ind.	4 00
Second premium, Mrs. Wm. Welch, Indianapolis, Ind.....	2 00
China lamps, Mrs. M. I. Julian, Indianapolis, Ind.....	4 00
Second premium, Mrs. Wm. Welch, Indianapolis, Ind.....	2 00
China, ornamental pieces, Mrs. W. S. Day, Indianapolis, Ind....	4 00
Second premium, Mrs. M. I. Julian, Indianapolis, Ind.....	2 00
China, flower design, Mrs. M. I. Julian, Indianapolis, Ind.....	1 00
Second premium, Mrs. M. I. Julian, Indianapolis, Ind.....	2 00
China, relief gold, Mrs. W. S. Day, Indianapolis, Ind.....	4 00
Second premium, Mrs. Laura Davis, Columbus, O.....	2 00
China, Doulton specimen, Mrs. Laura Davis, Columbus, O.....	4 00
Second premium, Mrs. M. I. Julian, Indianapolis, Ind.....	2 00
China, enamel, Mrs. Mary Phipps, Indianapolis, Ind.....	4 00
Second premium, Mrs. M. I. Julian, Indianapolis, Ind.....	2 00
China clock, Mrs. M. I. Julian, Indianapolis, Ind.....	4 00
Second premium, Mrs. Laura Davis, Columbus, O.....	2 00
China, coal portrait, Mrs. M. I. Julian, Indianapolis, Ind.....	4 00
Second premium, Mrs. Wm. Welch, Indianapolis, Ind.....	2 00
China chocolate set, Mrs. M. I. Julian, Indianapolis, Ind.....	6 00
Second premium, Mrs. M. I. Julian, Indianapolis, Ind.....	3 00
China fruit set, Mrs. Laura Davis, Columbus, O.....	6 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	3 00
China pudding set, Mrs. M. I. Julian, Indianapolis, Ind.....	6 00
Second premium, Mrs. M. I. Julian, Indianapolis, Ind.....	3 00
China soup set, M. E. McKee	6 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	3 00
China tea set, Mrs. M. I. Julian, Indianapolis, Ind.....	6 00
Second premium, Mrs. M. I. Julian, Indianapolis, Ind.....	3 00
China manicure set, Mrs. M. I. Julian, Indianapolis, Ind.....	6 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	3 00
China ice cream set, Mrs. M. I. Julian, Indianapolis, Ind.....	6 00
Second premium, Mrs. Laura Davis, Columbus, O.....	3 00
China punch bowl, Mrs. Mary Phipps, Indianapolis, Ind.....	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
Jardinere, Mrs. E. J. Chance, Alpine, Ind.....	4 00
Second premium, Mrs. Wm. Welch, Indianapolis, Ind.....	2 00
China conventional design, Mrs. M. I. Julian, Indianapolis, Ind...	4 00
Second premium, Mrs. M. I. Julian, Indianapolis, Ind.....	2 00
Ideal head, china or porcelain, Mrs. Wm. Welch, Indianapolis, Ind.	4 00
Second premium, Mrs. John Sparr, Indianapolis, Ind.....	2 00
Ideal figure, china or porcelain, Mrs. W. S. Day, Indianapolis, Ind.	4 00

Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
Portrait, china, Mrs. W. S. Day, Indianapolis, Ind.....	4 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	2 00
Display paintings on china, Mrs. M. I. Julian, Indianapolis, Ind...	10 00
Second premium, Mrs. W. S. Day, Indianapolis, Ind.....	5 00
Display paintings, oil, not china, Gwynne C. Price, Chicago, Ill...	10 00
Second premium, H. W. Barnitz, Urbana, O.....	5 00
Display paintings, water colors, Myrtle Taylor, Indianapolis, Ind..	10 00
Second premium, Minnie Akass, Indianapolis, Ind.....	5 00

CLASS LIII—Table Luxuries.

Maple syrup, Mrs. P. D. Stagg, Greensburg, Ind.....	\$2 00
Second premium, Mrs. W. H. Hollings, Greensburg, Ind.....	1 00
Maple sugar, Mrs. P. D. Stagg, Greensburg, Ind.....	2 00
Bread, wheat, yeast, Mrs. Anna Raab, Brightwood, Ind.....	1 50
Second premium, Mrs. O. C. McGannon, Indianapolis, Ind.....	75
Bread, wheat, salt-rising, Mrs. W. S. Hoss, Indianapolis, Ind.....	1 50
Second premium, Mrs. O. C. McGannon, Indianapolis, Ind.....	75
Graham bread, yeast, Mrs. O. C. McGannon, Indianapolis, Ind....	75
Boston brown bread, Mrs. W. S. Hoss, Indianapolis, Ind.....	1 50
Second premium, Mrs. J. B. Powers, Indianapolis, Ind.....	75
Rusk, Mrs. M. A. Johnson, Indianapolis, Ind.....	1 50
Second premium, Mrs. I. M. Porter, Indianapolis, Ind.....	75
Corn pone, Mrs. W. H. Hollings, Greensburg, Ind.....	1 50
Second premium, Mrs. O. C. McGannon, Indianapolis, Ind.....	75
Dozen rolls, Mrs. M. A. Johnson, Indianapolis, Ind.....	1 50
Second premium, Mrs. O. C. McGannon, Indianapolis, Ind.....	75
Gingerbread, Mrs. J. B. Powers, Indianapolis, Ind.....	1 50
Second premium, M. E. Bunker, Indianapolis, Ind.....	75
Ginger cookies, Mrs. W. S. Hoss, Indianapolis, Ind.....	1 00
Second premium, H. Jeffery, Franklin, Ind.....	50
Fig cake, Lida B. Hoover, Franklin, Ind.....	1 50
Second premium, Mrs. Chas. Marshall, Crawfordsville, Ind.....	75
Large cake, caramel, orange.....	1 50
Second premium, Mrs. O. C. McGannon, Indianapolis, Ind.....	75
Large cake, caramel, chocolate, Mrs. Chas. Marshall, Crawfordsville, Ind.	1 50
Second premium, Mrs. O. C. McGannon, Indianapolis, Ind.....	75
Marble loaf cake, May Faught, Indianapolis, Ind.....	1 50
Second premium, Mrs. Bert Boyd, Indianapolis, Ind.....	75
Cocoanut cake, Mrs. Chas. Marshall, Crawfordsville, Ind.....	1 50
Second premium, May Faught, Indianapolis, Ind.....	75
Sunshine cake, Mrs. H. C. Roney, Indianapolis, Ind.....	1 50

Second premium, Mrs. C. D. Aughinbaugh, Indianapolis, Ind.....	75
Angel food, Mrs. Chas. Davenport, Indianapolis, Ind.....	1 50
Second premium, Mrs. Bert Boyd, Indianapolis, Ind.....	75
Hickory-nut loaf cake, H. Jeffery, Franklin, Ind.....	1 50
Second premium, Mrs. O. C. McGannon, Indianapolis, Ind.....	75
Hickory-nut layer cake, Mrs. O. C. McGannon, Indianapolis, Ind..	1 50
Second premium, Lida B. Hoover, Indianapolis, Ind.....	75
Imperial cake, Mrs. Bert Boyd, Indianapolis, Ind.....	1 50
Second premium, Mrs. W. H. Hollings, Greensburg, Ind.....	75
Fruit cake, Mrs. M. H. Geyer, Greensburg, Ind.....	3 00
Second premium, Mrs. Chas. Marshall, Crawfordsville, Ind.....	2 00
White fruit cake, second premium, Mrs. H. C. Roney, Indianapolis, Ind.	75
White cake, Mrs. C. R. Myers, Whiteland, Ind.....	1 50
Second premium, Mrs. O. C. McGannon, Indianapolis, Ind.....	75
Chocolate cake, layer, Mrs. Chas. Marshall, Crawfordsville, Ind..	2 00
Second premium, Mrs. O. C. McGannon, Indianapolis, Ind.....	1 00
Chocolate cake, loaf, Mrs. O. C. McGannon, Indianapolis, Ind....	2 00
Second premium, Mrs. E. T. Drake.....	1 00
Perfection cake, Mrs. S. A. Harlan, Indianapolis, Ind.....	1 50
Second premium, H. M. Allison, Indianapolis, Ind.....	75
Crullers, Mrs. I. M. Porter, Indianapolis, Ind.....	1 50
Second premium, Helen Kelleher, Mapleton, Ind.....	75
Cream puffs, Miss Anna Bryson, Indianapolis, Ind.....	1 50
Second premium, Miss Alice Ricketts, Indianapolis, Ind.....	75
Cookies, Bettie Close, Indianapolis, Ind.....	1 50
Second premium, Anna Tucker, Indianapolis, Ind.....	75
Kisses, Miss Alice Ricketts, Indianapolis, Ind.....	1 50
Second premium, Miss Anna Bryson, Indianapolis, Ind.....	75
Meringues, Mrs. J. B. Powers, Indianapolis, Ind.....	1 50
Second premium, Miss Anna Bryson, Indianapolis, Ind.....	75
English plum pudding, Mrs. J. B. Powers, Indianapolis, Ind.....	1 50
Second premium, Miss Alice Ricketts, Indianapolis, Ind.....	75
Cheese straws, Miss Alice Ricketts, Indianapolis, Ind.....	1 00
Second premium, H. Jeffery, Franklin, Ind.....	50
Saratoga chips, H. Jeffery, Franklin, Ind.....	1 00
Second premium, Mrs. W. S. Hoss, Indianapolis, Ind.....	50
Spiced peaches, Anna Tucker, Indianapolis, Ind.....	1 00
Second premium, Mrs. M. A. Johnson, Indianapolis, Ind.....	50
Spiced pears, Mrs. M. A. Johnson, Indianapolis, Ind.....	1 00
Second premium, Mrs. Fremont Eastes, Mt. Comfort, Ind.....	50
Spiced cherries, Mrs. W. S. Hoss, Indianapolis, Ind.....	1 00
Second premium, Mrs. J. B. Powers, Indianapolis, Ind.....	50
Sweet pickles, collection.....	1 00
Second premium, Mrs. Fremont Eastes, Mt. Comfort, Ind.....	1 00

Pickles, mixed, Mrs. Fremont Eastes, Mt. Comfort, Ind.....	1 50
Second premium, Anna Tucker, Indianapolis, Ind.....	75
Pickles, cucumber, H. Jeffery, Franklin, Ind.....	1 50
Second premium, Mrs. W. S. Hoss, Indianapolis, Ind.....	75
Peach pickles, Lida B. Hoover, Indianapolis, Ind.....	2 00
Second premium, Lon A. Hornbeck, Indianapolis, Ind.....	1 00
Pear pickles, Lon A. Hornbeck, Indianapolis, Ind.....	2 00
Second premium, Anna Tucker, Indianapolis, Ind.....	1 00
Tomato catsup, Lida B. Hoover, Indianapolis, Ind.....	1 00
Second premium, Miss Florence Baxter, Indianapolis, Ind.....	50
Cucumber catsup, Lon A. Hornbeck, Indianapolis, Ind.....	1 00
Second premium, Mrs. Fremont Eastes, Mt. Comfort, Ind.....	50
Chili sauce, Mrs. I. M. Porter, Indianapolis, Ind.....	1 00
Second premium, Lida B. Hoover, Indianapolis, Ind.....	50
Boston baked beans, Mrs. M. H. Geyer, Indianapolis, Ind.....	1 00
Second premium, Lon A. Hornbeck, Indianapolis, Ind.....	50
Gelatine dessert, Miss Alice Ricketts, Indianapolis, Ind.....	50
Second premium, Miss Anna Bryson, Indianapolis, Ind.....	50
Collection French candy, Mrs. Chas. Marshall, Crawfordsville, Ind.	1 50
Second premium, Mrs. Bert Boyd, Indianapolis, Ind.....	75
Collection taffies, Miss Alice Ricketts, Indianapolis, Ind.....	1 50
Second premium, Mrs. J. B. Powers, Indianapolis, Ind.....	75
Collection jellies, Mrs. Fremont Eastes, Mt. Comfort, Ind.....	3 00
Second premium, Lon A. Hornbeck, Indianapolis, Ind.....	2 00
Collection preserves, Mrs. Fremont Eastes, Mt. Comfort, Ind.....	3 00
Second premium, Lon A. Hornbeck, Indianapolis, Ind.....	2 00
Collection fruit butters, Mrs. Fremont Eastes, Mt. Comfort, Ind..	3 00
Second premium, Bettie Close, Indianapolis, Ind.....	2 00
Collection canned fruit, Mrs. Fremont Eastes, Mt. Comfort, Ind...	3 00
Second premium, Bettie Close, Indianapolis, Ind.....	2 00

CLASS LIV—Professional.

Fanciest gelatine dessert, Miss Anna Bryson, Indianapolis, Ind....	\$2 00
Second premium, Miss Alice Ricketts, Indianapolis, Ind.....	1 00

Respectfully submitted,

JAMES E. McDONALD,
Superintendent.

REPORT OF SUPERINTENDENT OF MACHINERY DEPARTMENT.

To the Delegate State Board of Agriculture:

"The largest and most attractive exhibit ever seen on the Indiana State Fair Grounds" was the expression voiced by all exhibitors, as well

as hosts of visitors who took in the Fair of 1898. A great majority of the machine men said it was the most profitable Fair they ever attended and were glad they had come, notwithstanding the rain, that made it disagreeable to get around over the grounds a good part of the week.

The exhibit was more complete than it had been for several years before, as the threshing machine men were out again in full force, and this always makes an attractive exhibit. The fence and windmill exhibits were much larger than ever before. We had exhibitors with us from almost every State in the Union, displaying improved implements and farm machinery of every imaginable kind. By Saturday before the Fair all available space along the platted streets had been taken, and we found it necessary to crowd late comers back into the woods, much against their will, but it was all and the best that could be done. Some few parties applied for and were assigned space before the Fair, and failed to be present. This is a source of annoyance to the Superintendent, as exhibitors feel that they are not being treated fairly when there are vacant lots in front, and they are located in the rear. We suggest that when parties have been assigned space and do not report on the grounds prior to Saturday morning before the Fair, said assignment be canceled and that the space be given to those asking for it. This will also help to have all machinery in place in due season. As this very attractive exhibit costs us no outlay of money for premiums or taking care of same, we owe it to these exhibitors that every effort in our power be put forth to make everything as pleasant as possible for them, and we should show a willingness to extend to them every accommodation and favor we possibly can to win and retain their good will and patronage from year to year. We believe they feel that they have been treated right in the past, and we can promise them that we will strive to maintain the kindly feelings they have for us in the future.

It has become a custom among a great majority of the leading farmers of our State to visit the Fair every year, if they don't go anywhere else, and see what improvements are going on in the way of new implements that are calculated to lighten their burdens and expedite their work.

We believe that, when it is possible, every piece of machinery or implement exhibited should be seen in actual operation, so that its merits may be determined upon by parties interested. A place should be set apart for the trial of all kinds of plows, cultivators, harrows, seeders, pulverizers, drills, planters and the like. This would make our Fair a great object-lesson to farmers who desire to be up to date in every way. Farmers might also be asked to compete one with the other in performing different kinds of farm labor. We understand, for example, that the plowing match is one of the very interesting features at some of the fairs in neighboring States.

A great many regular exhibitors in this department have expressed a willingness to erect permanent buildings on our grounds another season,

and they should be encouraged to do so, inasmuch as we are yet unable to build a commodious power hall. When properly constructed, they add a good deal to the attractiveness of our grounds, as well as to the convenience of the exhibitor.

We found very little occasion to curtail favors to exhibitors in this department that were asked for in the way of tickets for helpers and those in charge of exhibits. All seemed very reasonable in their demands, and only in one case was there an attempt to impose upon the Board, so far as we could find out.

Quite a number of farm papers had tents on our grounds, and all spoke very complimentary of the manner in which the Fair was conducted and its unusually fine exhibits in all departments.

The following list of manufacturers and dealers were exhibitors:

Armour & Company, Chicago, Ill., fertilizer.

American Steel and Wire Company, Chicago, Ill., woven wire fencing.

Avery Planter Company, Peoria, Ill., corn planters, cultivators and stalk cutter.

J. R. Allen, Indianapolis, Ind., bicycles.

American Thresherman, Madison, Wis., American Thresherman.

American Harrow Company, Detroit, Mich., cultivators and harrows.

Akron Cultivator Company, Akron, O., pivot axle cultivators.

Bateman Manufacturing Company, Greenlock, N. J., full line agricultural implements.

O. P. Benjamin Manufacturing Company, Lafayette, steam well drilling machine.

J. E. Borps, Peoria, Ill., wire fence.

David Bradley, Bradley, Ill., full line farming implements.

Bimel Carriage Company, Sidney, O., buggies and carriages.

Bucher & Gibbs, Canton, O., agricultural implements.

E. S. Boardman, Indianapolis, Ind., buggy washers.

Henry S. Baird, South Bend, Ind., line light vehicles.

G. H. Brown, steel fences.

Brown Manley Plow Company, Malta, O., cultivators and plows.

Comstock & Crouse Company, Indianapolis, Ind., vehicles.

Cyclone Wire Fence Company, Holly, Mich., fence and fence machinery.

Chainstay Fence Company, Marion, Ind., fence posts, stays, etc.

Coquillard Wagon Works, wagons.

Columbus Buggy Company, Columbus, O., carriages.

E. F. Culbertson, Clermont, Ind., harrow, crusher and roller.

Crescent & Co., fence.

J. I. Crouse, threshing machines.

W. H. Clay, Elizabeth, Ky., gates.

Cast Steel Plow Company, Dayton, O., line farm implements.

Robert E. Carter, Janesville, Mich., fence machines.

Columbus Carriage Manufacturing Company, Columbus, O., buggies and carriages.

Challenge Mill Company, wing and feed mills and swings.

Cleaveland Fence Company, Indianapolis, Ind., washing machines.

J. H. Crookson, New Lexington, O., grinders.

Common Sense Harrow, Connersville, Ind., harrows.

Clipper Plow Company, Defiance, O., plows and cultivators.

H. T. Conde Implement Company, Indianapolis, Ind., implements.

Davis Gas Engine Works, Waterloo, Ia., feed mills.

Thomas M. DeFrees, Indianapolis, Ind., gas engines.

The H. Deuscher Company, Hamilton, O., line farm machinery.

Davis Manufacturing Company, Carrollton, Mo., corn harvesters, lawn swings, mills, scoop boards and hand wagon.

Davis Manufacturing Company, Carrollton, Mo., feed mills.

Dwiggins Wire Fence Company, Anderson, Ind., fence.

Dayton F. Company, manufactured goods.

Erie Cycle Manufacturing Company, Anderson, Ind., bicycles.

Ellis & Helfenberger, Indianapolis, Ind., fences, vases and arch iron-work.

Eagle Machine Company, Lancaster, O., cutting boxes.

Fairbanks-Morse Company, Indianapolis, Ind., windmills, scales and pumps.

The Fovs Manufacturing Company, Springfield, O., feed mill, sheller and harvester.

Fiske & Wood, carriages.

Wm. F. Fulton, Mansfield, O., carriages.

The Fulton Machine Company, Fulton, O., field roller.

Frost Wire Company, wire fence and bond posts.

Flint & Walling Manufacturing Company, Kendallville, Ind., wind mills, pumps, tanks, well-drilling machines.

Fairbanks, Morse & Co., Beloit, Wis., gas engines and steam pumps.

Frick Company, Waynesboro, Pa., traction engine, sawmills, separators.

Goshen Steel Fence Company, Goshen, Ind., fence posts, etc.

Globe Machine Works, Indianapolis, Ind., dairy engine.

R. H. Gilbert, Richmond, Ind., fence machines.

The Geiser Manufacturing Company, Waynesboro, Pa., engine, separator, huller.

Globe Fence Company, Canandaigua, N. Y., fences, gates.

Garland Buggy Company, Kalamazoo, Mich., buggies.

Isaac Golden, Indianapolis.

A. C. Evans Manufacturing Company, Springfield, O., farm machinery.

W. B. Hulton Manufacturing Company, Indianapolis, Ind., implements and buggies.

J. C. Haw Good Road Machinery Company, Indianapolis, Ind., road machinery.

Hogle Gas Engine Works, Shelbyville, Ind.

Haworth & Sons Manufacturing Company, Decatur, Ill., farm implements.

Hayes Pump and Planter Company, Galva, Ill., farm implements.

Hoosier Drill Company, Richmond, Ind., drills and planters.

Hench & Dromgold, York, Pa., farm implements.

Hamson Wagon Company, Grand Rapids, Mich., wagons.

Hoke Manufacturing Company, South Bend, Ind., cultivators and harrows.

Homer Steel Fence Company, Battle Creek, Mich., steel post fence.

A. Howard, Gallon, O., buggies..

N. S. Hughes, Indianapolis, Ind., windmills and tanks.

Hartman Manufacturing Company, Vincennes, Ind., cultivators and plows.

Hay & Willet Manufacturing Company, Indianapolis, Ind., bicycles.

John Hampton, Indianapolis, Ind., buncher and mower.

Indiana Manufacturing Company, Indianapolis, Ind., wind stackers and threshers.

Indiana Manufacturing Company, Indianapolis, Ind., wind stackers.

Indiana Pump and Specialty Company, Indianapolis, Ind., engines, pumps, drainers, tanks and towers.

Indestructible Post Company, Brazil, Ind., fence posts.

E. Johnson, Indianapolis, Ind., plows, cultivators, shovels and harrows.

Janney Manufacturing Company, Muncie, Ind., shredders and planters.

A. J. Johr, Indianapolis, Ind., carriages.

Janesville Hay Tool Company, Janesville, Wis., hay tools.

Janesville Machine Company, Janesville, Wis., agricultural implements.

E. E. Jackson, Indianapolis, Ind., wagons, cultivators and harrows.

O. S. Kelly Company, Springfield, O., road rollers and sawmills.

Kinney & Sullivan, Indianapolis, Ind., implements, buggies, wagons and rubber tires.

Kokomo Fence Company, Kokomo, Ind., fences, gates and posts.

Kokomo Rubber Company, Kokomo, Ind., rubber manufactures.

Kitselman Bros., Ridgeville, Ind., fence and fencing machinery.

King & Hamilton, Ottawa, Ill., corn sheller.

Knickerbocker Agency Company, Indianapolis, Ind., regulators.

S. Kaufman & Son, Indianapolis, Ind., fertilizers.

Laporte Carriage Company, Laporte, Ind., carriages.

Long & Allstatter, Hamilton, O., cultivators, rakes, harrows, plows and fodder cutters.

- D. S. Lovett & Co., Indianapolis, Ind., ground feeds.
Middletown Machine Company, Middletown, O., gasoline engines.
Morris Woodhull, Dayton, O., carriages.
Miller Bros. Manufacturing Company, Alexander, Ind., mills and separators.
Moreland & Co., Burlington, Ia., stump pullers.
Moline Plow Company, Moline, Ill., full line agricultural implements.
P. P. Mast Buggy Company, Springfield, O., drills and cultivators.
Mast, Fous & Co., Springfield, O., windmills, pumps and lawn mowers.
Michigan Buggy Company, Kalamazoo, Mich., carriages.
Marseilles Manufacturing Company, Marseilles, Ill., corn shellers, feed grinders and windmills.
Milwaukee Hay Tool Company, Milwaukee, Wis., huskers and shredders.
Marion Manufacturing Company, Marion, O., engines and separators.
R. G. Marcey, Bluffton, Ind., windmills, pumps.
P. P. Mast Buggy Company, Springfield, O., buggies.
C. H. Mitchell, Laporte, Ind., mills.
F. E. Myers & Bros., Ashland, O., pumps, mills, hay tools.
The Mier Buggy and Carriage Company, Ligonier, Ind., buggies and carriages.
McSherry Manufacturing Company, Middletown, O., mills.
Monarch Manufacturing Company, Indianapolis, Ind., acetylene gas machine.
Michigan Carbon Works, Detroit, Mich., fertilizers.
Mohland & Co., Burlington, Ia., stump pullers.
New Birdsell Company, Auburn, N. Y., thresher and husker.
Northwestern Scraper Company, Anderson, Ind., scrapers, plows and road machines.
National Drill Company, Dublin, Ind., drills, weeders and rakes.
Oliver Chilled Plow Works, Indianapolis, Ind., plows.
Ohio Cultivator Company, Bellaire, O., farming implements.
The Ohio Rake Company, Dayton, O., farm machinery.
Reed Creamery Company, Philadelphia, Pa., creameries.
Rauh & Sons, Indianapolis, Ind., fertilizers.
Rude Bros. Buggy Company, Liberty, Ind., drills, rakes and cultivators.
Rock Plow Company, Rock Island, Ill., farm implements.
Reeves & Co., Columbus, Ind., farm implements.
Rosenthal Corn Husker Company, Milwaukee, Wis., corn huskers.
Rippley Hardwin Company, Grafton, Ill.
Russell Wind Stacker Company, Indianapolis, Ind., wind stackers.
S. H. Railsbach, Indianapolis, Ind., plows, ice-cream freezers.
Russell & Co., Marseilles, O., farm machinery.
L. D. Railsbach, ice-cream freezers.

- E. W. Ross & Co., Springfield, O., feed cutters and corn mills.
Richmond Buggy Company, Indianapolis, Ind., buggies.
Page Woven Wire Fence Company, Adrian, Mich., wire fencing and animals.
Geo. Paier, Indianapolis, Ind., drills.
Parlin & Orendorff Company, Canton, Ill., farm implements.
Portland Feeder Company, feeders.
The Pneumatic Elevator and Weighing Company.
J. E. Porter & Co., Ottawa, Ill., farm implements.
C. & A. Potts & Co., Indianapolis, Ind., hay press.
Parry Manufacturing Company, Indianapolis, Ind., vehicles.
Poindexter Manufacturing Company, Indianapolis, Ind., machines and sharpeners.
Rasin Fertilizer Company, Baltimore, Md., fertilizer.
Star Manufacturing Company, New Lexington, O., grinders.
Schuus Plow Company, plows.
Sayers & Scoville, Cincinnati, O., carriages.
Elmer E. Stewart, Indianapolis, Ind., blacksmiths' tools.
Scioto Buggy Company, Columbus, O., buggies, carriages and traps.
D. M. Sechler Carriage Company.
Theo. Sawyer, Towanda, Ill., automatic gate.
E. Sprankle, Kendallville, Ind., tanks and heaters.
G. H. Shover, Indianapolis, Ind., carriages.
Stoddard Manufacturing Company, Dayton, O., farm implements.
Shimer Fence Company, Anderson, Ind., fences.
Smith & Pomeroy, Kalamazoo, Mich., windmills.
Superior Drill Company, Springfield, O., drills, harrows.
Syracuse Chilled Plow Company, Syracuse, N. Y., plows.
St. Joseph Manufacturing Company, Mishawaka, Ind., plows.
Safety Husker and Shredder Company, Indianapolis, Ind., huskers, shredders and saw.
Geo. Swert, revolving hood.
Troy Carriage Company, Troy, O., carriages and buggies.
Union Corn Planter Company, Peoria, Ill., planters.
Union City Carriage Company, Union City, Ind., buggy and carriages.
Vermont Farm Machine Company, Bellows Falls, Vt., dairy machinery.
Wayne Works, Richmond, Ind.
Wood Bros.
Wayne Company, Decatur, Ill., vehicles.
Willey Machine Company, Springfield, O., mowers and bicycles.
Wilson Wire Fence Company, Holly, Mich., wire fence and machinery.
Whitman Manufacturing Company, St. Louis, Mo., press, sheller, mill, engines.
Westcott Carriage Company, Richmond, Ind., carriages and buggies.
W. H. Young, Indianapolis, Ind., baling press.

Zell Gleand & Co., Bellemore, Mo., fertilizers.

Zimmerman Manufacturing Company, Auburn, Ind., windmills.

Respectfully submitted,

W. W. STEVENS.

Superintendent.

REPORT OF SUPERINTENDENT OF ADMISSIONS.

To the Delegate State Board of Agriculture:

Gentlemen—As Superintendent of Gates, I would respectfully recommend that a coupon should be required to be deposited by each person passing the gates, and that all general passes without coupons, such as buttons or otherwise, be discontinued, as they afford great facilities for unscrupulous persons to defraud the society, thus lessening the receipts of the society, and without material advantage to any one but to this class.

I would further recommend that as few different kinds of tickets be used as possible. It is less complicated, and any errors can be more readily detected.

The gates, entry and exit, are now as conveniently arranged as can be with ample accommodation for handling the largest crowds that can attend the Fair.

The cost of this department for the year 1898 was \$289.05.

Respectfully submitted,

AARON JONES,

Superintendent.

REPORT OF SUPERINTENDENT OF PRIVILEGES.

To the Delegate State Board of Agriculture:

Gentlemen—I beg to submit my report as Superintendent of the Privilege Department of the 1898 Fair:

Contracts were made amounting to nearly \$4,000, but, owing to the gloomy weather, many never set up and quite a number could not, or would not, pay up in full. Total amount collected, \$2,691.35. Expense of department, \$60.90.

I would respectfully suggest that the ground be so platted that the Superintendent of the Mechanical Department and Superintendent of the Privilege Department will each know just where the other's space is, and can thus avoid much annoyance to both of them. Also the ground, as it exists, and the plat as now made, do not seem to correspond, and if privileges are sold by the plat they will overlap in places. The credit system is much abused by privilege people, and I would suggest that rules are made so that every person must pay 20 per cent. on making their contract and the other 80 per cent. before occupying the space.

The pass privilege is also greatly abused, and I would suggest that the number of passes be greatly reduced and that badges be given helpers, allowing them to stay on the grounds. Give church people passes good for only one admission, and others who are compelled to go into town, a very limited number, good for two admissions per day.

We, I believe, succeeded in keeping hop ale off of the grounds after Monday before the Fair.

Respectfully submitted,

H. L. NOWLIN,
Superintendent of Privileges.

REPORT OF AUDITING COMMITTEE.

To the Delegate State Board of Agriculture:

Gentlemen—Your committee heretofore appointed to examine the books, vouchers and reports of the Secretary and Treasurer have performed that duty by checking up all receipts and expenditures, and find the reports of Secretary and Treasurer agree with the vouchers and entries on the books.

We recommend that a full account of uncollected credits, such as suspensions and all miscellaneous accounts be entered of record in the Secretary's books as they occur, and that collections on same be reported in the Secretary's annual financial report, in each case specifying from what source each item has been received; and that every claim and bill be entered on a claim docket properly numbered and indexed to make of easy reference.

We further recommend that an account of all bills payable and receivable be kept; also a condensed tabulated statement of agreements entered into by the Board, and conditions of same; also a concise statement of insurances held, with rate and expiration, so as to make them of ready and convenient reference to any member of the Board.

We also recommend that each superintendent of departments furnish and file with the Secretary an itemized statement of all rents that should be received by his department for stalls or otherwise; and that a full itemized statement of all receipts from every source, including amounts paid in speed department, and that the Secretary be required to give to each person paying money a receipt stating for what received, and that a full statement be made on the stub of each receipt, and that said stubs be kept as part of the records of the Secretary's office.

Respectfully submitted,

AARON JONES,
JOHN C. HAINES,
W. W. STEVENS,

Committee.

Meeting adjourned to meet at 2 p. m.

SECOND SESSION OF THE ANNUAL MEETING OF THE STATE BOARD OF AGRICULTURE.

Meeting called to order by the President, Mr. Downing, at 2 p. m., January 3.

Mr. Downing said: Gentlemen of the Board, this afternoon we are to discuss the benefits of the State Fair. This is a subject in which we are all interested, and it is a subject that will stand a great deal of discussion. We are all Fair men, and actively engaged in the management of fairs, and we ought to know all about county fairs and a great deal about State fairs.

WHAT ARE THE BENEFITS OF THE STATE FAIR TO THE HORSE INDUSTRY?

GEORGE A. GIFFORD, TIPTON, IND.

There are but few, if any, of the prominent industries connected with agriculture that have been so directly and seriously affected by the modern inventions as has the horse industry. The horse has in the past half century been compelled, as a power producer, to compete with steam, electricity, gas and to some extent with man himself. With each advance in the means of utilizing these competing powers, with each addition of speed, utility, convenience and comfort, as a result of the intelligent scientific thought on the part of the scientist, inventor and investigator, came victory to the inanimate powers applied to the machine; defeat to the horse. With each contest his sphere of usefulness has become more circumscribed. No longer do we see the long line of heavy teams of four or six horses, with massive harness and bells, drawing the freight wagon across our country. No more the stage coach goes lumbering over our highways. They are things of the past. The horse surrendered to the freight train in the first instance, to the steam and electric passenger systems in the second, while the result and usefulness of the horseless carriage and bicycle are yet to be determined. What does all this mean? What does it signify? Simply this: that the horse's competitors are being advanced by the most intelligent, painstaking minds of the age, and that, too, on the most approved and scientific lines. It means that if the horse industry sustains itself, even in its most advantageous fields, it must be done by the application of an equal amount of intelligence and enterprise as is being applied to the advancement of its competitors.

And here let me say, and emphasize the statement, too—do not understand me to criticize the breeders of fancy horse stock. The horse fancier has been equal to the emergency. The sharpness of competition, with other matters, has aroused and quickened his every faculty. The light-harness horse, as the product of this intelligent development, is a marvel; the two-minute limit, thought for many years to be an impossibility, has been passed. The unshapely, angular brute of the past, afflicted with no attraction excepting speed, is rapidly being transformed into an animal of intelligence, beauty and stamina, with increased speed. The draft horse has been equally fortunate. He has passed from the cumbersome, clumsy, barrel-headed, shapeless mountain of flesh into a shapely, intelligent engine of power, made attractive by style, finish and action.

The other families of horses have come in for like improvement. Registrars, stud-books, authentic histories of the blood lines and performances of these various families have been established. Horse-breeding has been placed on a scientific and intelligent basis. No longer is the horse fancier satisfied with a pedigree as of old, such as "sired by a Morgan horse—dam, a good road mare from Vermont," or "sired by Black Lion and out of Kentucky mare."

It is now an accepted fact that it matters not how good an individual horse in any family may be, he is not worthy to take a place in the reproduction of his species unless his blood lines are approved, unless his inheritances are of the proper kind.

While this is true, individual merit is not, as of yore, being overlooked. Pedigree is not counted all. The stock horse, to be acceptable to the intelligent breeder, must have good individuality, good intelligence and disposition, soundness, be free from vices and faults. More, the critical breeder will study these blood lines and find what they indicate on all these questions and qualities; will study the individual progenitors for several generations and find what there may be latent in the individual, but which may be transmitted from a remote ancestor. This is the standard set up by the fancier of Indiana.

Where did this ideal come from? Largely from the comparison and study of the various classes of horses. Where can such comparison and study be best prosecuted? Can it be done at home among one's own herd? Surely not. The more densely ignorant one is on these questions, the more likely he is to be satisfied with his own stock, the more likely he will be to stand around the race track and tell you how old Jane or Tom or John could beat any such going as Star Pointer or Alex were doing, if he just had Jane, John or Tom there and hitched to the buggy.

In the production of the horse, as in that of all other animals, and as in the production of all machinery and manufactured articles, the only real and true way of finding the best is by actual comparison by competition. The State Fair is and has been the best school for this in our State. It has been and is best from the fact that it draws from a wider scope, brings

a greater number of animals together for comparison. Further, it gives breeders a wider acquaintance and places a much larger range at their command from which to select brood stock.

Again, the horse fanciers of the State breed but a small per cent. of the horses of Indiana. There are about 700,000 horses in the State; of these about 98 per cent. are bred by the farmers. In horse-breeding we are truly American. Every man has a right to raise any kind of a horse he may desire, or rather any kind he may chance to raise. Unlike some of the European countries, there is no restriction placed by the government on the kind of stallion that may be kept for service. Each farmer rests wholly upon his own judgment, biased and warped it may be by his cupidity and his belief in luck, and his lack of information on blood lines and the influence of the law of inheritance. When any kind of a horse would sell, and that, too, for a fair profit on cost of production, chance-breeding was not so bad; but since things have changed, if the horse ever pays his raising (for he must be five years old before he goes into market), he must have been bred for some specific purpose and must be good for such purpose.

Hence the education had by the fancier must be carried to the masses in order that the State shall be freed from these thousands of worthless nondescripts, and breeding made profitable. This education can not be accomplished through horse and agricultural papers solely. The average farmer may read these papers and form good theories, but he can not from them conceive perfect ideals of animals. It is different when he has a chance to compare the good pure-bred animals with their kind and with the mongrel. The State Fair is the most useful means so far that has been adopted for this school of comparison. It brings thousands of farmers from all parts of the State and the object lesson is placed before them. This is especially true with the breeders who desire to produce other than the light-harness or speed horse. The speed families have their special competition outside the fairs, and hence are not so dependent for their advancement upon the State Fairs. The wonderful development of the trotters and pacers is due to this competition. The race, the actual trial of merit, has in this case emphasized the law of the survival of the fittest. The reputation given an animal by being a winner at a State Fair or other large fairs is of great benefit to the community. Men who have but little experience and whose judgments are not ripe on this line, trust to these approvals, and they are thus led correctly by the judgment of others. It is difficult to make a comparison of the quality of the horse stock produced and placed upon the market at the present time with that of some years back by making a comparison of prices then and now. This is apparent from the facts I have heretofore stated. The demand has been diminished by the various motors that have taken the place of the horse. In the market the horse is practically confined to the fields of very heavy draft and personal gratification and pleasure. The good specimens of either of

these classes, I am informed by the buyers, are selling for as good prices at present, compared with the values of all other property, as they ever did. The largest buyers and sellers in our State, those so situated as to be best able to form correct conclusions on the subject, tell me that there is a large per cent. of good horses—horses bred with an intelligent purpose and filling fairly well that purpose—than was ever before produced in our State or placed upon our market. This is encouraging. It is one of the results of our State Fair. The small pittance paid out in premiums to the horse breeders of Indiana and other States has been of no marked benefit to the breeder, but, as before remarked, the benefit resulted because of the bringing together at our State Fair of a large number of the various breeds from our own and other States; has impressed the agricultural public with the importance of breeding a horse of some specific family for a definite purpose; has created an ideal in the minds of the breeders and has, by that education, improved our horse product. This is important to the general wealth of the State. There are 700,000 horses in the State, and if their average value is only \$5 per head more by reason of the knowledge disseminated through the means of the State Fair, we are to the better by \$3,500,000, and the general wealth has been increased by that amount. I am informed that in the city of Indianapolis, during the past year, there have been sold at public auction nearly 16,000 horses at an average of about \$50 per head; this will not represent more than one-half the horses sold in the State. I mention this fact for two purposes—(1) to show the magnitude of the interest; (2) that a large number of these animals are sold for such low prices as to bring down the general average, and are actually selling for less than the cost of production. Hence, the great necessity of intelligence in the general business.

In discussing this proposition and in attempting to prove that the State Fair is a benefit, an invaluable adjunct to the horse industry of the State, it is much like attempting to prove an axiom; like proving that things equal to the same thing are equal to each other, or that the whole is greater than the part. That the horse interest is worthy of his fostering, of this encouragement, is likewise a fact so patent that argument could add but little or no force. It is a fact, the statement of which carries with it its own proof. I have not time to compare horse interest in value with other live-stock interests, but suggest it is one of the most important from a standpoint of value.

Since the days when Job wrote his beautiful poem on the war horse, since the time when Xenophon led back to Greece the gallant ten thousand and celebrated their return by horse-racing and games, there has never been a moment that the horse, and especially the war horse and the race-horse, has not held first place among all animals in the affection and estimation of civilized man. The higher the civilization, the grander the horse. If the modern inventions and inanimate powers drive him entirely from the field of motor power, yet he will remain the pet, the pride

of the wealthy and cultured, and the only marked change will be the demand for a more perfect horse. This demand can best be filled, this ideal can best be obtained, by the aid of the competition on the show ground, and especially the show ground of the large fairs, such as the State fairs and that held at Madison Square Garden.

The time will never come when the princes of the earth will not be ready to exclaim, with Richard III, "My kingdom for a horse," provided the horse is good enough.

I would like to add a word about the great advantage of large fairs. The result of having small fairs is that they break down and prevent the holding of one really good fair in the county. How to correct this and how to encourage the holding of one good fair might be a good subject for this meeting to discuss.

WHAT BENEFITS TO THE CATTLE INDUSTRY?

PROF. C. S. PLUMB, PURDUE UNIVERSITY, LAFAYETTE, IND.

An agricultural fair is an educational medium. Here, once a year, the people of the State have an opportunity to examine the different types of products of the farm and shop, whether they be crops, live stock or machinery. The smaller the fair, the less the opportunity for the visitors to see these types, while the larger the fair, the better the opportunity. And so it naturally follows that the State Fair, the highest and largest phase of our fair development, offers to the visitor the best chance for informing himself concerning the things there shown. Here are brought together exhibits from all over our own State, as well as from other States, often situated many miles from our border.

A museum is an educational exhibition, and for many years museums have had a recognized place in education, as is shown by their establishment in the leading institutions of higher learning, and in great cities all over the civilized world. In certain well-defined directions, in its collections shown for exhibition, an agricultural fair represents a temporary museum. If properly managed, both should produce good results.

One feature of the exhibition at a fair is its cattle, and in our great central west, this is an important item. At the show of the Royal Agricultural Society of England, in 1897, nearly 900 head of the finest cattle of England, Scotland, Ireland and Wales were exhibited. At our own State Fair, and other State fairs, hundreds of head of cattle are exhibited each year that represent the highest stage of the breeders' art. In 1898 there were entered for exhibition at the Indiana State Fair 530 head of cattle, representing ten different breeds. Think of what a show that was!

Now, how does this cattle show benefit the cattle interests of the State? For it is through this exhibit that the State Fair benefits our cattle interests, if at all. This is accomplished in several directions, by affording opportunities to—

1. Study Specimens of One Breed.
2. Compare Breeds.
3. Introduce New or Little Known Breeds to the Public.
4. General Influence on Casual Visitors.
5. Exhibitors and Visitors to Meet for Acquaintance and Business.
6. Breeders to Compare Notes.
7. See How Animals Are Fixed or Fitted for Exhibition.
8. Learn What the Market Demands.

Let us briefly consider these different points.

1. OPPORTUNITY TO STUDY ONE BREED.

There are in the State many breeders who await eagerly the annual State Fair, that they may visit those animals on exhibition representing a breed they are handling, that they may study high class examples of the breed. It is to their advantage to inspect these animals, to study the size, body type, handling, bone, hair and flesh quality, and see wherein qualities exist that are superior to those in stock of their own breeding, and which they should create in their own herds. How many earnest Shorthorn breeders have been influenced to visit the Indiana State Fair and study the character of Gay Monarch or Mary Abbotsburn, and what inspirations have these animals created? No one can tell, but without question Robbins, VanNatta, Nave, Miller, Douglas, Goodwin, Judy, Heavilon, LaGrange, Raab, Stanton, Wheatcraft and many others, through State fair lessons, have improved their herds and so added to the fame and wealth of Indiana as a State producing fine cattle. I think this is unquestionably true.

2. COMPARE BREEDS.

There are many people who have no better opportunity to draw comparison between the several breeds, where it relates to type, than at the agricultural fair or stock show. The interested person may visit the cattle barns, inspect individuals of different breeds, make comparisons, may talk with the breeders, and when the breeds are in competition for sweepstakes, he has an opportunity to draw group comparisons. These are really valuable opportunities and nowhere does one secure such unless at the fair. Consequently its importance should not be overlooked. Evidence seen in such examinations may often cause the examiner to arrive at conclusions that otherwise he may not have reached.

3. INTRODUCE NEW OR LITTLE KNOWN BREEDS TO THE PUBLIC.

To-day the State Fair offers a superior medium for advertising the different breeds. Fifty or 100,000 people may inspect the contents of the cattle barns during the week. Some of these are looking for novelties. Special inquiries are made relative to a breed but little known. Polled Durhams, Red Polls, Dutch Belted, Guernsey and Ayrshire are examined as candidates for public favor, with which the masses are but little acquainted. And this State fair contact increases the knowledge of the breed, and induces others perhaps to purchase and number themselves among its advocates and breeders.

At the Trans-Mississippi Exposition, at Omaha, this year, was shown a pen of polled grade Hereford cattle, the results of a certain line of breeding of Judge Guthrie of Kansas. He stated to me that through the press the public had learned of these cattle, and he had received so many letters asking for information concerning them that he thought it would be a good plan to show them at Omaha. This he did, and much interest was shown in them, visitors constantly looking them over.

This is simply an illustration of the value of showing a new breed at a fair. During some years back Mr. J. H. Miller, of this State, showed a herd of Polled Durham cattle at our State Fair, and placed them in the show ring in competition. In these days Mr. Miller was establishing a herd, and he used the fair as one of the means for advertising it. To-day he is known as one of the foremost breeders of this class of cattle in America, and has shipped Polled Durhams extensively over the United States and even to foreign countries. It is reasonable to assume that the State Fair played its part in making this breed better known, and Indiana as the place where good specimens could be bought.

4. GENERAL INFLUENCE ON CASUAL VISITORS.

Thousands throng the fair grounds and stroll from object to object in idle curiosity. But here and there something strikes the eye and engages the attention of one of these idlers that makes an impression of a lasting nature. And here people become interested in cattle who heretofore had supposed them uninteresting and unattractive. Of the thousands sitting on the grand stand watching the judging, some at least for the first time become more than superficially interested. A row of magnificent dairy cows, with widely distended udders, may point to dairy possibilities he had never dreamed of or thought possible. And a dozen broad-backed, deep-bodied, thick-chested, beautiful beef cattle side by side, may show him a beef development that will inspire him to the creation of the like himself.

The influence of this stock show on the crowd can not be measured in any definite manner, yet undoubtedly it is far greater than most of us realize.

5. EXHIBITORS AND VISITORS MEET FOR ACQUAINTANCE AND BUSINESS.

Engagements are made by breeders and their correspondents at the fair where animals are inspected and an opportunity afforded for consideration of matters, which will give far greater satisfaction than can be secured through correspondence. Many points can be brought out where buyer and seller meet before the animals that can not of necessity be made clear through correspondence.

In another direction, the breeder or exhibitor will often take pains to interest visitors to the barns in the stock and to stimulate an acquaintance in live stock matters. The parading of the animals before the visitors and the distribution of literature concerning the individual herd or breed will certainly stimulate some thought in the right direction.

6. BREEDERS COMPARE NOTES.

The men who go the rounds of the fairs and show live stock, represent in a general way the most progressive and intelligent breeders that we have. Most of them are constantly seeking for new information that will enable them to breed better animals and so strengthen their herds. Every time a number of breeders get together they compare notes, discuss individuals, types, food stuffs, methods of treatment, etc. These men are found in large numbers at the fairs, and they do more to keep the standard of breeding high—they do more to improve the quality of the stock of the country, whether it be in the feeder's or breeder's lot, than we can possibly estimate. There are breeders in this State who show year after year at the fair, whose high class males are or have been in service in herds of all kinds for years in Indiana. Theirs is the blood, secured through intelligence, exacting care, patience, toil and outlay of money, that gives standing to many herds of this State that have only a local influence, yet which are a credit to their owners. And when these breeders, tried and experienced, get together, many ideas are exchanged, some of which eventually work to the advantage of the State. Unless they meet in special sessions, in regular organization, such as in a live stock association, breeders have no place equal to the fair grounds and show ring for exchanging experiences and getting new ideas.

7. SEE HOW ANIMALS ARE FIXED OR FITTED FOR EXHIBITION, AND METHODS OF SHOWING.

A good business man desires to exhibit his goods so as to show to best advantage and thus promote trade. This applies most emphatically to the man who shows live stock at the fair. Animals brought in from the

field and shown in an indifferent manner, never attract the attention of the crowd or win prizes, as do those that are fitted for the exhibition and are then shown to best advantage. While the operation of fitting begins months before the show, during the exhibition people may, if they will, learn of the foods used and methods of feeding and may note practices that are followed to improve the appearances of the animals, such as polishing hoofs and horns, grooming, training, etc. . And in the show ring some men have their stock trained to attention in a manner worthy of an old soldier, while other beasts in less expert hands, are uneasy, are often in ungainly positions and so show at a disadvantage.

In this respect the State Fair serves as a valuable medium for the stockman to get ideas, in that it will enable him to present his animals in the most attractive form before the public. It is true, you may say this is a minor feature, as affecting the topic under discussion, but nevertheless it is one of numerous things which has its place in a consideration of the question, and its importance in influencing people to get interested in cattle, is an unknown quantity.

8. LEARN WHAT THE MARKET DEMANDS.

While the stock market is the proper place to learn what the market demands in certain directions, the agricultural fair is also a place to learn what the market calls for in other directions, especially with breeding stock. Here the observer sees what is nearest perfect in type of beef or dairy animal. Here he may learn what color, form, size and style is in greatest favor among the breeds. What type of an udder is most demanded by the best informed breeders? A row of fine, aged milch cows will show considerable variation in form of udder, but there will surely be one type must more in demand than others. There is the large, up-standing, inclined to coarseness beef animal, and the smaller, lower down, more refined beef animal in the same class. Current talk around the show ring and the awards of the judge will often show men that they are not growing the kind of stock the market demands. Here a telling lesson is taught them.

Since 1851 the Indiana State Board of Agriculture has had many thousands of pure-bred animals shown upon its fair grounds, millions of visitors from all over the State have viewed them and many thousands of dollars have been distributed among exhibitors as rewards of merit. Who will pretend to say that these annual exhibitions have not greatly benefited the State? Certainly, the argument is mainly in favor of the exhibition. As to how great the returns are to the State, who can say? Certainly no man can measure the benefits, but unquestionably they have been very great and have more than repaid the State for the money expended in that direction.

WHAT ARE THE BENEFITS OF THE STATE FAIR TO THE SWINE INDUSTRY?

ADAM F. MAY, FLAT ROCK, IND.

Mr. President:

Gentlemen and Officers and Members of the Delegate State Board of Agriculture of the Great State of Indiana—The subject assigned me for discussion before you to-day, "What are the benefits of the State Fair to the Swine Industry?" gives me a very large field to work from, and yet I feel that I am unable to give the State Fair its full amount of justice in this subject.

First, I wish to say that the best way to do business with anyone is to talk to them personally; this is much easier and more, far more satisfactory than by correspondence, and at our State Fair an exhibitor or breeder of swine meets and converses with hundreds of breeders and farmers on the subject of swine. He shows them the quality and state of this stock, talks blood, lines, pedigrees, prices, etc., and by thus coming in close touch with each other, whether he be a regular farmer or a special breeder, he sees not only the difference in quality in the different herds of the same breeds of hogs but he can also see and compare the several different breeds as well, and this, not only of the State of Indiana, but of other States as well, and there is no other place known where one has this opportunity, and by doing thus he can make a selection much more suitable than if he had only one herd or breed to select from.

Thus, by attending the State Fair, there is a great saving to the purchaser, as he can there see for the possibly small sum of five or ten dollars, what it would probably cost him four to five hundred dollars to see if he were to call on each herd separately, besides not having the pleasure of bringing the several herds or breeds close together for comparison, and there is certainly no fair-minded person but what would rather buy or sell from inspection than by correspondence. Again, no breeder can advertise his stock so thoroughly with the same amount of expense as to exhibit at the State Fair.

For the farmer and breeder alike, generally wait for the State show before making a valuable addition to their herd. Why? Not because the hogs there are any better than at home or on the farm, but because we can there buy, by inspection and comparison of hogs all over the country.

And again many a man who was not in the business at all has from some motive attended the State Fair, and after seeing the exhibits and realizing the difference between the thoroughbreds and the mongrels, has while there resolved to start to breeding hogs, or possibly better hogs, and in a great many cases this resolution has been carried into effect.

Not yet two years since the first State Fair exhibit of swine was made in the State of Kentucky, and I will here venture the assertion that there has been more hogs shipped into the State of Kentucky since that State Fair or in the last sixteen months than there has been in any one five years previous to that date. During this first exhibit of swine in the State of Kentucky, it was remarked by a great many people that they did not know hogs could be made to grow so large, fat and smooth. So you can here see what the State Fair did for the good people of our sister State, but for that State Fair these same people would have lived in ignorance, so far as their knowledge of hogs was concerned.

So the State Fair of to-day is not only a savings bank to the people of the swine industry but it can also very creditably be called an educational association. Here is where the breeders from all over the country meet and compare notes and find out how business is in general; you here learn just what you have in the hog line, you find out the weak points of your herd, as compared with the strong points of another herd. Here you also find the animals that you think will make the right cross on your herd so as to bring it up to the standard of excellence. There is not a better place in the world to find this out and at so small a cost as at the State Fair. For in order to see all the hogs on the farm that you can see at the State Fair, you should have to visit possibly one hundred herds at a great sacrifice of both time and money.

If a breeder has good stock, is posted on his herd, can show the points of their animals and their breeding and has the interest of the herd at heart, he can no more afford to miss attending the State Fair than the fair can afford to do without an exhibition.

There is also a social feature connected with the State Fair and the swine industry that no breeder can afford to miss that is much benefit in a business manner.

Fairs, in my opinion, are very largely to blame for, and, in fact, the sole cause of a great many shows and breeding animals that are being to-day exported to foreign countries, instead of being altogether imported as was the case a few years ago.

All one needs, to prove the fairs are a great benefit to the swine industry of this, as well as other States, is to consult with the veteran breeders of swine. Go to the fair records, consult those and you will find such men as Joe Cunningham, Lloyd Mugg, James Riley, J. N. Barker and A. W. Ross, and that old and veteran breeder, A. S. Gilmore, of Greensburg, Indiana, who has followed the fairs for the past forty-five years and more. In fact, all these, and many more have shown at the fairs for years, and most of them are still showing, but if not showing are always at the fair.

We must not think such men as these attend the fairs with stock and lay around in exposure, simply for pleasure or for the few paltry dollars the fair association can afford to pay them as premiums. No, indeed; most of them have a living without doing this for so small an amount.

I would suggest that you ask any old reliable or successful breeder to what he owes his success as a breeder of swine, and his answer will invariably be that the fairs have contributed as much to his success as a breeder as any other thing he could mention.

I wish to repeat that I consider the fairs, especially the State Fair, one of the greatest educators we have for the swine industry. Take the showing as we have seen it here in Indiana, with possibly twenty-five to fifty head in the same class, competing for the paltry sum of ten to twenty dollars as a premium, and each one well deserving the ribbon, where, in fact, to the judge, it is almost like tossing a copper for the results, see these twenty-five to fifty head lined up for comparison, and where is the man who could travel the State over, go from farm to farm and make the selection as well as he could as to have all here before him. These are the facts that create the desire in indifferent breeders to have better stock, and these men in time become specialists in breeding, thereby scattering the good fruits to different parts of the State.

Where is there a place you can witness these facts except at our fairs? Go to the showing at our State Fairs and you will find from the comments and criticism that most all hogs in competition have been bred so nearly the standard of excellence that sometimes our best judges are liable to differ on a decision, and our fairs have been an important factor in reaching this point of excellence.

Therefore, I repeat, no one thing has done more to develop the ideas of correct breeding as well as to develop a knowledge of what to breed and how to breed it than our State Fairs.

WHAT ARE THE BENEFITS TO THE SHEEP AND POULTRY INTERESTS?

HON. SID CONGER, HOPE, IND.

I see the Secretary put me down at twelve on the program. Years and years ago when the gentlemen who preceded me on the program were at the fairs I told them all these things they have in their papers. I knew there was a scheme to put me below them, because I taught them all the good things they put into their papers years and years ago. Now, what are the benefits of the State Fair to the Sheep Industry? In the first place, they take less barn room than the horses and hogs and cattle, consequently they are less expensive to the fair. In the second place, everybody likes to go and look at the sheep—ladies and children and visitors of all kinds; they are not afraid of being injured as they are by the cattle and horses. Sheep bring more people to see them than all the other stock put together. Farmers come there and buy breeding stock and improve their flocks,

and instead of getting from four to six pounds of wool as they had been doing, they get from ten to twelve pounds in a very few years. That is a benefit to the people and to the farms. Sheep bring up the land and improve the farm, and any man who has raised sheep for four or five years has fewer weeds and briars than the farmer who has no sheep on his land.

Now as to the poultry industry. I am here to prove that your horses are not in it with the poultry. There are more visitors to the poultry at our State fairs than to all the other live stock. Then there are more exhibitors of fine poultry, and consequently the fair management gets more money for the entries. Then the poultry exhibits only take one building. There are two hundred and sixty million dollars worth of poultry sold every year in this country, and we import over twenty millions of dollars worth every year, both poultry and eggs.

Another advantage is that you can always get cash for your poultry and eggs at your door. The poultry industry supports more people and there is more money in it than any other live stock industry. We shovel out our corn by the wagon load to hogs, and then sell them at three cents a pound. There has never been a time in the history of this country when poultry did not sell for more to the pound than any other live stock. It looks foolish for people to feed stock and hogs and sell them for three and four cents a pound, when they can get eight and ten cents a pound for poultry. This year I will admit poultry is down to six and one-half cents, but for the past eight or ten years it has sold on foot for eight and nine cents. You must remember that when I speak of "poultry" I include turkeys. Even at the price they are this year poultry is still above pork and mutton in price, and if you want to grow a pound of meat I would advise you to grow the pound that will bring you the most and cost the least to raise.

The question was asked from the audience: "Is it not your experience that the capons of this country are bringing a third more all the time than any other class of chickens that are sold? Can you not get from ten to fourteen cents in a good market always for capons?"

That is true. In my county there are a great many capons, and they always get those prices. They sell higher than any other class of chickens always.

DISCUSSION.

Mr. Mitchell: I have a neighbor that has been offered 25 cents a pound, and the prices are eight and ten for dressed poultry, and have been for the past few weeks. Hogs have sold recently for \$2.90 and \$3.00.

Mr. Robbins: Just what are the benefits of the State Fair to the cattle interests? I will say that no other influence is so beneficial. It is the best source of advertising we can have. Many of the cattle men get together at the time of the Fair and discuss their interests and have a good time, and the social features are not to be ignored by any one.

Mr. Kennedy: Was not your experience at the World's Fair with cattle the means of giving you more demand for your stock than any other experience of your life?

Mr. Robbins: Yes; it undoubtedly was.

Mr. James D. Williams: I think the subject, "What Benefits to the State at Large," is one of the greatest importance to the citizens of the State; it covers all the ground. This is the subject in which I believe every farmer in the house is interested in. I wish to speak only of my own experience in attending State fairs and good county fairs.

The farmer with any ambition-whatever who visits the fairs and sees the exhibits of other men—cattle, sheep, horses and hogs, whatever his fancy may run to—if he has any ambition whatever to embark in any line to which his fancy leads him, nothing will create such a desire to get into that business as visiting the State Fair and seeing the exhibits made by other farmers. This first caused me to embark in the business of breeding shorthorn cattle. While I am a lover of any good cattle, my preference runs to the shorthorns. Visiting the State Fair and seeing what improvement there could be made in the way of cattle, and my tastes lying in that direction, made me anxious to go into the business for myself.

The Fair is an institution of education to the farmers. I think it should be the pride of every farmer in the State to take it upon himself to see that our Legislature gives the State Board of Agriculture the recognition it deserves in the way of an appropriation. If we would compete with our sister States, with Illinois and Ohio, our State must stand by the State Board of Agriculture as the Legislature of Illinois does by their State Board. Every farmer

and stock buyer and machinery man, and also every merchant and professional man in Indiana should see to it that our Legislature does give good assistance to our State Board. If these facts were brought out in the discussions of the farmers and the matter taken directly to the Legislature, it would be of benefit to every farmer in the State. I am sure I shall feel it my duty to lobby for this purpose. I feel that we are entitled to part of the appropriations that are made from time to time by the Legislature to help the farmers and stock raisers and manufacturers of the State.

Mr. Seward, Bloomington; I think it is acknowledged by everyone who has any thought or experience on the question, that the State Fair ought to be perpetuated and these benefits made continual. I will say here, for the information of those who are not acquainted with me, that I served for twenty years as a member of the State Board of Agriculture. I have watched its interests closely, and I have come to this conclusion. When I first became a member of the Board we paid premiums on everything. Being a manufacturer of agricultural implements, I was one of the men who introduced the resolution abolishing premiums absolutely in the mechanical department. We were warned that if we did so we would have no mechanical exhibit, yet the evidence that has accrued since then shows that we have had larger and better exhibits than ever before. It often happened that the wrong article obtained the premium, and this injured the manufacturers very much. In the live stock department the premiums have been increased. I do not object to increased premiums, but I do object to increased classification. There is where the harm is done. Speaking of cattle, with my limited knowledge of this department, I only know of two kinds of cattle, the beef cattle and the dairy cattle. In our premium list we have at least eight or ten classifications. Some of these breeds are only bred for fair purposes. I think that is wrong. If a premium is awarded to one man for the best Herefords, that settles the question as far as Herefords are concerned; but here is another grade of cattle, and still another and another, and they all get premiums, but that does not settle the question of

which is the best breed in competition. This is wrong. There should be first, second and third premiums on a certain kind of beef cattle. The same could be done with the milk breeds. I believe there ought to be an expression from this meeting on this subject. I know my ideas will not meet with the approval of cattle and horse men. They have told me that the larger the premium list, the larger the gate receipts. I am not sure of that. The day was when you went to the fair grounds, and the first thing you did was to go directly to the cattle pens. Now a farmer goes to the fair and strikes for some side show, because he has just as good cattle on his own farm as are in the pens. I have seen fine pens of cattle there with not ten men watching them when the exhibits were made. I think that is a good sign, for it shows that farmers have just as good cattle on their own farms. I think this will apply to all the exhibits—poultry, sheep and swine exhibits, as well as cattle exhibits.

I think we ought to do something so that the State Board could meet the debt obligations of the State Fair. Why not go to work on what seems to me the proper principle, and let every breeder of cattle that is competing for breeds, compete against one another; then some time or other we will know what is the best breed. I submit, gentlemen, whether it is not reasonable and fair that the Board should be assisted by eliminating about four-fifths of the classes and giving the Board more money to expend and not bring it out in debt.

Mr. Downing: In addition to the great number of classes that are given or provided for in the premium list in the State Fair we have a class in which all of the beef breeds compete for a \$500 prize, and in that competition it is decided which is the best beef breed.

Mr. Nave: I believe there is room in this country for all the breeds, and I believe all the breeds should be encouraged, and the great sweepstakes prize should be abolished. While I had the honor to take the sweepstakes prize at the last Fair, I think it should be abolished, because I think it is detrimental to the cattle industry.

Mr. Mitchell: The sweepstakes does not increase the exhibit. There are so many different ideas about the matter. Then, the sweepstakes does cause ill-feeling. I think the whole fact of running fairs is based upon the gate receipts, and the management will wisely bring the average gate receipts up by horses and poultry and cattle. To get large gate receipts you must have large exhibits. I visited the State Fair this fall, and the novelties there drew the crowd. We are still holding fairs in our county in the old-fashioned way, and I think it is as good as any.

Mr. Seward: I neglected to say that my plan does not prevent any one from bringing his cattle to the fairs. Of course, every one thinks his own cattle the best, and we can take them there and if they are not the best we have a chance to learn that fact. I have had a little experience with this classification and non-classification of stock, and I would say by all means classify the stock. I find it gives better satisfaction, and what I have learned of it I have learned from the demands of the people, which I think is the best way to learn a thing. As far as a grand sweepstakes is concerned, I think that is a farce, because you might have a number of different kinds of cattle, and each one may have his favorite among the breeds, so I say classify them and do away with the sweepstakes.

Mr. LaGrange: As an exhibitor and fair manager, I would say never put them all together. If you want to get into trouble, put them together. The grand sweepstakes does not satisfy anybody. The Shorthorn men think the Shorthorns ought to have it, the Durham men think the Durhams ought to have it, and the Polled Angus men say the Polled Angus ought to have it. I think more cattle would have been brought here if they had taken that \$500 sweepstakes prize and divided it among the breeds. The idea in having breeds exhibited is to bring out a large number of cattle and herds. The idea is to get as many cattle and as good cattle as you can get together, but don't, under any circumstances, group your breeds.

Mr. Downing: Does not a large sweepstakes premium bring a large crowd of people to see what breed is going to take the prize?

Mr. LaGrange: I do not believe it. Among the fair-going people and breeders, they usually have their minds made up as to what breed of cattle they prefer, and they go there to see what specimens of breeds are best. They have their minds already made up as to which breed they prefer, and this does not change them.

Mr. Wilson: I say give the biggest premiums you possibly can, and give the grand sweepstakes at last. Sometimes one will get the premium, sometimes the other, owing to the kind that is on exhibition at that particular time. Sometimes the Polled Angus will be the best on the ground, sometimes the Durhams, sometimes some other class; but bring them all together in the sweepstakes at the last.

Mr. James D. Williams: We have to admit one thing as breeders of beef cattle, and that is that competition has brought us nearer together. It has brought us nearer together in the formation of our beef animals, in the type and in the symmetry. The fact that we compete with other breeds and learn of the merits that the Awarding Committee has passed upon, has caused us, as breeders, to improve upon the breed we have in that special point. For that reason often the three special beef breeds—the Angus, the Herefords and the Durhams—are nearer together in their quality than they were ten years ago. The Shorthorn men found in competition with the Herefords that in years past there was objection to the herd in the distance of the cattle from the ground. The Angus and the Herefords both had the advantage over the Shorthorns in this respect. What was the consequence? The Shorthorn men went to infusing blood into their cattle to get them nearer the ground, so that they could compete with the Herefords and the Polled Angus. The Hereford men found years ago that their lacking quality was in the hindquarters of the cattle, that they were not of the excellence in this respect that the Shorthorns were.

What did they do? They selected bulls to head their herds to fill out and conform as nearly as possible to the Shorthorns. The Polled Angus did run to extreme in depth of body and not in symmetry. They found that in competition with both the other classes they had to improve in that connection, and they have improved and are still improving their cattle in that direction. The three different breeds of beef cattle are nearer in symmetry and formation than they were ten or twelve years ago. This has brought us all to the point where we are all aiming to produce the greatest per cent. of beef with the least waste. Probably ninety per cent. of the entire number of breeders of the country are judged from the butcher's standpoint, and not from the feeder's standpoint. As to classifying them, I believe this is a good thing. Take, for instance, in your State Fair to-day, and you have a class for Shorthorns, a class for the Herefords, the Polled Angus, the Galloways and the Reds, giving five distinct classes premiums. Would it not be well to take this money, and instead of giving two or three premiums, as you do now, take this money that is given in five separate classes, put it in a lump and let all the classes compete, and make four premiums that would require more money than the association pays to-day. The first money could be almost doubled, and for the second you can pay as much money as you pay to one of the breeds now. It would be more for a man to come into the ring and win first money, though the intrinsic value would be no greater, and it would be a greater honor to win second place than the amount of money won if the breeds were shown separately. The only dissatisfaction that might arise from this grouping of the herds is that it does not prove anything conclusively, yet it does educate all breeders in the direction that I have spoken of, in bringing the formation of our cattle nearer together. The honor will be greater in this way to the men who win than if they won only in competition with those of their own breed of cattle.

Mr. Kennedy: You have said if you want to see contention you can bring it about by competition of breeds. Now, that argues

to me that this competition of breeds means something to the public, else it would not disturb the minds of the exhibitors. It does tell a story to somebody other than breeders, and that is what we are trying to do, educate the public. The breeders are educated already. Now, I want to ask this question. What do you raise beef cattle for? I take it for one purpose—to produce the best quality of beef and bring the best price in the market for that beef. If we can not determine what is the best beef product by bringing to judge upon it a man who has spent years of his life upon the block cutting beef, as we did this year, a man who is not connected with breeding in any way, if we cannot determine something for the public with that kind of competition, it seems to me the whole purpose of the State Fair is lost. I believe this is one of the best educational features of the Fair we had this year.

Mr. Thompson: I think Mr. Kennedy loses sight in his argument of this point. In this great country of ours we need all these breeds. One breed may do better in a certain locality, better than another. From that standpoint we need all the breeds, and I am sure there is nothing better for us than competition. We do not change anybody's mind. We get up a good deal of disturbance, but that does not satisfy anybody. We want to make Indiana a State for all the breeds, and that is one of the objects of the Fair.

Mr. Mitchell: This sweepstakes settles nothing so far as the quality of the beef is concerned; you have got to get the animal on the block.

Mr. Thompson: I have had some experience in fair management, and also as an exhibitor, and we have eliminated every mention of different breeds. If the other argument is good, that this \$500 brings people here, I think we had better spend that in special attractions.

Mr. Robbins: I have always been an advocate of competition between breeds, but I have almost gotten out of that notion because of the wrangles and hard feelings about it, and the fact that

nothing is settled by it. I believe good results have been obtained by this class of shows. We have got to nearly the same type now, and it would be well enough to lay off for a few years and see how the other way will work. I am of the opinion that there is no show that will get up as much interest among the outside breeders and the small breeders as a competition between breeds, and whether it is not all right for the Fair Association from that standpoint is an open question.

Mr. Jones: I have always had an opinion upon this matter of sweepstakes. If it would be possible to get a judge who was competent to judge all classes alike there might be some fairness, but it seems to me that any man who has a preference for some breeds is incapacitated for judging all the breeds together. Therefore I think it proves nothing at all, and I have all the while been opposed to this sweepstakes prize, and do not believe it amounts to anything in competition at all. It amounts to nothing, only the paying out of so much money, unless it may bring some money at the gate. If there can be more money got in that way by \$500 paid in that way I think it should be done, but I do not believe it brings in any more money at the gates.

I move that this matter of sweepstakes, all the way through, be abolished, and that a vote be taken upon this at the end of this discussion.

Motion seconded.

Mr. Downing: You might tie the hands of this association in this way.

Mr. Mitchell: It is simply to get an expression of opinion from this meeting.

Mr. McDonald: In advertising the Fair last fall I found a great deal of interest manifested over the State on this battle of the breeds. The interest was manifested among stock men and among people who visited the Fair to find out what kind of an exhibit we were going to have. A great deal of interest was shown among

people who wanted to know how many herds we were going to have and what kinds were going to be in competition, but the thing that elicited the most attention was embodied in the expression made by an eminent Northern Indiana stock raiser and stock dealer and buyer. He said: "That is going to be a big show, I expect. I would like to see it, but I would like to ask you one thing, and that is, where are you going to get your judge?" That expressed the whole thing to me. It depended upon the judge and his environment and surroundings and all that. I do not believe it is a practical demonstration of the best breed of cattle, and am afraid the money is not used to the best advantage.

Mr. Nelson: I want to say here that you have two of the best judges in America to-day at your State Fair, Mr. Pickering and Mr. Imboden.

Mr. Robbins: At Springfield, Ill., we have a meeting every year of the National Breeders of Live Stock of America. Mr. Nelson says you have two of the best judges in the United States. If everyone had known that these two men were going to tie the ribbons last year we would have had a great many exhibitors here who were not. This sweepstakes business has been a good deal of a farce at times. At our Shorthorn breeders' meeting this forenoon we passed a resolution asking this association to publish the name of the judge at the head of the list. At the Omaha Exposition the name of the judge was not published on the list, and no one could learn who the judge was to be until within a few days of the time when the award was to be made. When it came to the grand sweepstakes all the Hereford breeders except one, and all the Polled Angus breeders except one asked the management to remove this man.

Mr. Downing: Give your best reasons for publishing the judge's name.

Mr. Robbins: For the same reason that you would want to know who was going to try your case in court, that you have a right to it. If we spend ten or twelve months' time fixing for a

show we have a right to know whom we are going to show under. If we come there and this man's name is published it keeps down all complaints, for we show by coming there that we are satisfied that he is a proper person to judge.

Mr. Downing: Will not publishing the name at the head of the list keep away exhibitors from the Fair?

Mr. Robbins: It may, but for the same reason you will keep away some men who do not know the judge. In Omaha I heard good exhibitors say that they would never go to a show of that kind again unless they first knew who was going to tie the ribbon.

Mr. Nelson: I am decidedly in favor of not publishing the name of the judge. Let the State Board select whom they think best and stay right with him every time.

Mr. C. W. Scott: I am opposed to this movement of instructing the Fair management in any manner whatever. It will never do to allow the exhibitors of cattle or any other department to make the rules. I am in favor of voting this movement down and letting the State Board use their best judgment of these things, whether it suits one class or not. You cannot please them all clear through our fairs.

Mr. Jones: The motion is that we favor the abolishment of the sweepstakes prize. Now, if you vote it down it makes you in favor of the other side.

I move to lay the motion on the table.

Motion seconded.

Mr. Downing: This is not for the purpose of suppressing debate. We want the benefit of the discussion and the judgment of the members here present to-day.

Motion to lay on the table carried.

Nominations for members of the Fifth, Sixth, Eighth, Ninth, Tenth, Eleventh, Twelfth and Thirteenth Districts.

The following names were placed in nomination for these districts:

Fifth District—H. L. Nowlin, Guilford, Ind., the present incumbent.

Sixth District—Knode Porter, Hagerstown, Ind., the present incumbent.

Eighth District—Charles Downing, Greenfield, the present incumbent.

Ninth District—F. A. Nave was nominated; also William T. Beauchamp, of Terre Haute.

Tenth District—John L. Davis, Crawfordsville, Ind., the present incumbent.

Eleventh District—M. S. Claypool, Muncie, Ind., and W. W. Morgan, of Crawfordville.

Twelfth District—Mortimer Levering, Lafayette, Ind.

Thirteenth District—John L. Thompson, Gas City; Hon. George A. Gifford and Joshua Strange, of Tipton, Ind.

Meeting adjourned to meet at 10 o'clock Wednesday morning, January 4.

THIRD SESSION OF THE ANNUAL MEETING OF THE DELEGATE STATE BOARD OF AGRICULTURE.

Meeting called to order at 10 o'clock by the President, Mr. Downing.

Mr. Downing announced that a meeting of Fair managers would be held in Room 11, State House, at 1 o'clock p. m.

Mr. Blackstock: I suggest that the date of the State Fair be fixed at the first meeting of the new Board, and that the date be published at once. I think that this should be done so that managers of county fairs can fix their dates so as not to clash with the date of the State Fair. We do not want to hold county fairs at the same time the State Fair is going on, as we will all want to attend the State Fair.

Mr. Hulet: The county fairs are fixing their dates, and the majority of them have virtually fixed them supposing that the State Fair would take the date assigned by the National Association, the 18th to the 23d. I believe that they advance the State Fair one week. Our Fair could be from the 11th to the 16th, Lafayette to precede that, Muncie that and Danville, Ill., to precede us. For that reason I suggest that this Board, either the old Board or the one just to be elected, fix the date of the State Fair so that the county boards can fix their dates accordingly. No county wishes to have their date clash with the State Fair if they can help it. We all wish to make the circuit.

Mr. McDonald: It is very important, I admit, but realizing as I do that there are other interests in this matter that we have to consult, I should like to have action postponed upon it. Illinois, Wisconsin and Ohio have already fixed their dates. If we come in conflict with any of these dates it will be to our disadvantage. We must consider this matter from the standpoint of our interests and try not to conflict with the dates of other State Fairs. Of course, we are all in favor of the last week in September, and I would like an arrangement by which it would be held on that date. I think that would be the best week for the Indiana State Fair, but Illinois has taken that week and we cannot hold our Fair simultaneously with Illinois.

Mr. Kennedy: The eastern part of the State Fair circuit is broken up, but the western part is still intact. Beginning with Nebraska and then taking Wisconsin and Illinois, and then Indiana, we will have better exhibits. One reason why Illinois has better live stock exhibits than we have is that they come in their regular order in the circuit and get the exhibits from the other fairs.

Dr. F. A. Bolser, State Veterinarian, presented a paper on—

THE LIVE STOCK INTERESTS OF INDIANA.

Mr. Chairman and Members of the State Delegate Board:

Gentlemen--Our subject, "The Live Stock Interests of Indiana," is one of very great magnetism. In this article it will not be our purpose to make any distinction as to breed. You are aware that every imaginable breed of live stock is bred and raised in our great State of Indiana.

We Americans let nothing pass without trying it; after trying we can make up our minds as to the best and most profitable stock for us to raise. It is one in which every man, woman and child has an indirect interest, and the agriculturalists, every one of them, a direct interest. It is the growth and the increase of our live stock that makes the most money for the agriculturist. One can scarcely comprehend the enormous amount of money the live stock brings to our people every year, and it is impossible to get exact statistics on the subject, but suffice it to say that it amounts to hundreds of thousands of dollars annually as an income, saying nothing about the amount that is consumed as food, from the product, in the way of meat, milk, butter and other various causes.

The improvement in every branch has been very great in the past ten years. Those who produce the draft horse have learned that it is impossible to get a two-thousand-pound animal by crossing a Texas pony with our Normans, Shires or Clydes. Like begets like in size, conformation, disposition, action, etc. Hence the necessity in straight breeding in every branch, not only in the horse but in every other branch of the live stock interest. The selection of heads of herds is a most important feature in the success of our business. It is a true saying that "A head of a family holds the balance of power." I think if we were to take a vote on this subject it would be unanimous, there being no ladies present.

But the next important feature is in the selection of matrons. One should never keep a poor animal just to eat the slop, because the animal had gotten used to them and they to the animal. A dozen good matrons will bring you more money with less care than double the number of an inferior class. I heard a gentleman say--and, by the way, a Hoosier--"that since commencing in the horse business, probably fifteen years ago, he had not sold less than \$13,000, and as high as \$73,000, worth of horses annually." This means an enormous amount of money for one breeder, and we are glad it has been accomplished in Indiana. He attributed his success to very careful study in breeding. He said he always bred for size, finish, action, and disposition, and if you have a dozen good dams with those qualities, a sire with the same, it is no trouble to get what you want.

One of the most important features in the raising of live stock is the necessary arrangements for taking care of your animals, especially in the winter season. Any kind of stock will thrive better that is kept in a good, warm, clean and thoroughly ventilated and lighted stable. There is nothing that will bring you more for your work than regular feeding and watering; it is as necessary as it is for you to have your meals regularly.

Another very important feature is cleanliness. If your stables are swept every day, there is not the chance for accumulation of disease-producing germs. The stock raiser who is particular about light, ventilation, drainage, disinfecting, etc., has very little disease among his stock. A nice, clean bed of straw for any of our live stock is enjoyed as much so as a spring mattress by ourselves.

The many contagious diseases indigenous to our live stock can often-times be traced to neglect in sanitary matters, especially so in the infectious diseases. As State Veterinarian we have observed in many instances the necessity of educating the agriculturist, that his stock should have the same water from the same driven well that he himself drinks. Only last fall we were called to investigate a trouble where a farmer had lost eleven horses before reporting any trouble. The party had one horse left. Upon our arrival we made inquiry where the horse was. We were informed that the animal was on the back part of the farm, in the woods, supposedly suffering from a contagious trouble. Upon going to the horse we passed a pool of water, the most filthy I had seen for months. Just above the pool was the hog yard, and a watershed with natural drainage from the hog yard to the pool; one could scent the pool for rods. I said to the owner: "Do any of your stock get water here?" He said: "All of my stock are watered there." "Well," I said, "would you like to drink that water?" "No, sir!" was his answer. "Why not? It is not good enough for you, but it is for your best servant." The party looked at me in amazement. I said: "Sir, a man has no business owning a horse or any other animal that he will force to drink water he would not drink under any circumstances." It had never dawned on this gentleman that an animal could contract disease from the use of stagnant water; if a frog could live in the pool, the stock could relish it.

We found a nicely developed case of cerebro-spinal meningitis. In those cases, generally, the owner imagines his neighbor has poisoned his stock, and we have quite a task explaining the real cause, the mind being fixed on the supposed enemy; but by urging the discontinuing of the use of infected water or food, as the case may be, and renovating and disinfecting premises, the owner, losing no more stock, becomes convinced.

We have had glanders almost entirely eradicated from our State until recently there were shipped into Indiana a great many Western horses. With one car came the dreadful trouble; animals were sold at auction and scattered all over the country—hence the source of distributing the trouble. But I think we have in quarantine all the exposed animals, and have destroyed those that have developed glanders.

The commission would like very much to pass a rigid quarantine restriction on Western horses, providing for an examination of all horses coming from a range country. But with our limited appropriation it would be impossible to enforce the order. We are very glad to note there have been no deaths in our State from glanders in the human family in the past five years. Up until that time we would frequently have deaths from the dreadful disease. To illustrate: There was a case—and which was a very sad one, indeed—of a little girl six years old, in southern Indiana. Her papa had traded for a horse said to have distemper. He was carrying the little one in front of the horse. The animal blew a small piece of virus into the little girl's eye. She at once became inoculated, and on the night of the eighth day afterwards she passed away in horrible agony, the flesh dropping from her face until one could see the cheek bone. One can not realize the horrible conditions brought about by this terrible disease. It is a very lucky thing that the disease can only be contracted by inoculation through mucous serous membranes or a wound.

The cattle growers of Indiana should be happy to know that there was but one outbreak of Texas or splenic fever in the State in the past year. Four years ago the loss was very great from this disease, but by the organization of an Inter-State Live Stock Sanitary Commission, comprising all States north of schedule district that we could possibly get together, and the co-work of the Bureau of Animal Industry, we have been able to keep Southern cattle under strict quarantine, the only one in the past year coming through the Cincinnati (O.) yards.

Our honorable Secretary, Mr. Mortimer Levering, was elected Secretary of the said inter-State organization, thus giving our commission every advantage possible. When a suspected car or any animal is being conducted from any State into ours, the Secretary is notified, and we at once look after the suspected case. Mr. Claypool, of our commission, has a photograph of one car of Southern cattle caught at Evansville, Ind. They were beauties. If you have an opportunity, get Mr. Claypool to show them to you.

The railroad companies have acted admirably, with but very few exceptions. All are anxious to comply with any quarantine restrictions proposed. They are the parties most interested, aside from the owners of stock, and unless stock is kept free from contagious diseases they can not carry them.

The sanitary conditions in every dairy should be the very best. All cattle will remain more healthy, give more milk, raise nicer, larger calves, when the necessary care is taken. Conditions can not be too carefully arranged. Many of our infectious diseases common to the human family are alike common in the lower animal. Oftentimes scarlet fever, typhoid fever, and many other diseases, are traced to infected dairies. When such is the case and report is published, every dairy in the State suffers more

or less; hence the necessity of the healthy cow in nice, clean, thoroughly ventilated, lighted and drained quarters, with good, pure food and water.

The question which every cattle grower in the State is most interested in at the present time is that of tuberculosis, the death rate in the human family being, I believe, 20 per cent. from tuberculosis in some of its forms, which has caused very great alarm; and the fact that a small per cent. of our cattle are sufferers from this dread disease demands for the protection of the especially small children and young animals that all cattle should be tested with the tuberculine test. It is impossible in many cases to diagnose tuberculosis without the use of tuberculine, and there should be a sufficient appropriation made by our Legislature to test every dairy herd, heads of herds and all cattle, in fact, kept for raising. The appropriation should be sufficient to pay for all cattle slaughtered. This would produce an incentive with all to have their herds tested. When herds have been cleared of all affected animals, every one will feel more safe in using milk and butter, and the sale of dairy products will increase. This disease alone has driven many families to the use of butterine, etc. This evidently has its effect on the cattle interest. The united effort of the cattle growers of Indiana should be to have all animals tested. Purchase no animal for breeding or dairy purposes that has not been tested, a certificate of official test accompanying the same. Dr. Salmon, Chief of the Bureau of Animal Industry, in one of his reports, illustrates cases where pigs that had been fed on whey from creamery had contracted tuberculosis to a very great per cent. This, of course, does not occur in Indiana to a very great extent, but it only goes to show the necessity of eradicating as nearly as possible the disease from our herds.

The past low prices were the cause for a great many of our breeders to discontinue the business, and the scarcity of animals such as should head herds has brought about a steady demand and an increase in prices, especially so in beef breeds. The facilities for caring for our cattle in the winter season are so far in advance of Western countries that a great many farmers are growing more grass and more cattle. We have observed, in traveling over the State, that the farmer that grows plenty of grass, and the place covered with stock, is the one that has good, comfortable buildings, well painted, fences well kept, and has a generally prosperous appearance.

The Indianapolis Stock Yards Company have worked earnestly and effectually to make it one of the leading markets of the United States. Their railroad facilities can not be surpassed, and, being centrally located, it is of very great interest to every stock raiser in the great State of Indiana. The company deserves commendation in bringing about one of the best export markets in the United States for all classes of export stuff. All this gives stability to our market. We are informed that the annual report of the Indianapolis Stock Yards Company shows a very great increase in all departments, especially so in the export business. We also have John S. Lackey's annual combination sale of horses at Cambridge

City, Ind., amounting annually to about \$75,000; S. J. Fleming & Son's combination sale of horses at Terre Haute, Ind., amounting to about the same, and our frequent sales of high-class stock of all kinds. All tend to give stability to the business. In western Indiana a great many cattle are fed. There are parties in Benton County that are feeding as many as a thousand head. The number fed annually by the Indiana Distilling Company, of Terre Haute, together with the large feeders in western and northwestern Indiana, give to western Indiana a very great per cent. as to the cattle-feeding interest.

We were called last week to investigate an infectious trouble in a herd of four hundred head of cattle, belonging to a gentleman in Benton County. The party had lost five from cornstalk disease. The late rains, luxuriant growth of vegetation, together with late frosts, has caused quite a great deal of sickness and some deaths from fungi poison. It is not a contagious, but an infectious trouble. The gentleman told us that he had just sold 134 steers that brought him, at home, at \$90 per head, \$12,000. The gentleman did not tell us what they cost him, but suffice it to say that his bank account was nicely increased.

The dairy business, so far as breeding dairy cattle is concerned, has about the same interest all over the State. We are proud to say that until last fall there was owned in Indiana an unbeaten bull of the dairy breed; he has been shown in all the important show rings in America, and is as yet unbeaten; and we are also proud to say that one of the most successful beef herds in America, as show cattle, is owned in Indiana. We are also proud to say that we have in Indiana a gentleman who has gone abroad and purchased one of the best and highest-priced beef bulls in the world. We are also proud to say that the highest-priced harness stallion in the world is owned in Indiana; yet it is only fair to say that Indiana is lacking in high-class draft horses, and, in fact, in this particular class, does not stand as high as she did some years ago. However, we are glad to note that there are quite a number of firms in Indiana that are striving to bring about the old-time interest in this especial class.

In southern Indiana there are a great many high-class mules raised. Uncle Warder Hamilton, of Greensburg, can tell us how to make money in the mule business.

As to the hog interest, it is alike distributed nearly all over Indiana, and our breeders of all kinds, when straight-bred, have met with good prices for animals for breeding purposes, notwithstanding the fear of an attack from cholera. The increase is so rapid, when the necessary care is taken, that it does not take but a few months to acquire a large herd. and the demand for medium hogs is so great that our hogs are marketed at about eight months of age, and escape from cholera or swine plague is an assurance of a nice income. As we have said before, the most necessary thing, to have a healthy herd, is nice, clean quarters, with pure food and water. It is true, in breeding hogs as well as cattle or any other ani-

nial, that you can put more pounds on a well-formed good-bred animal quicker and for less money than one of inferior breeding.

The sheep interest is distributed all over Indiana, so far as breeding is concerned. The feeding is largely in northern Indiana. Our importers are meeting with success in all breeds, they commanding good prices for all imported stock. All sheep coming through stock yards should be dipped to prevent scab.

Our fairs bring about an increased interest in all branches of live stock raising. The agriculturist, while enjoying social relations, sees and talks about the different improvements in the different breeds, and makes up his mind as to the best method of improving his stock.

The exhibition of beef herds at the late State Fair was the grandest sight that I have ever seen. The battle for supremacy was grand, and I have thought that had it not been for inclement weather, that kept the thousands of people from seeing that grand show, it would have been worth thousands of dollars to our breeders. Not only in this department, but in all, were the exhibitions grand, showing the improvement on every hand and in every breed of live stock.

We believe that the State and county fairs have done more to bring about the high standard of our live stock in this State than any other one thing.

The State Board of Agriculture deserves commendation for their earnest effort in their work. The inclement weather is the only thing that prevented us from having the greatest and grandest Fair that Indiana has ever had, and we earnestly hope the show will be equally as good this year.

DISCUSSION.

Mr. Mitchell: Can you give us any information about the fungi disease spoken of?

Dr. Bolser: We had a great many rains and we found in our work over the State that there was a great deal of fungi on the corn. It is a disease of the digestive organs caused by these fungi on the corn.

I think if all of the tramping parties and travelers with diseased horses were kept out of the State we would not have nearly so many diseases among our horses. I have known of many cases where the owners of the horses were confident that they had contracted it from the trampers and travelers on the road.

Mr. Mitchell: In southeastern Indiana a farmer had been throwing his fodder down on the floor of the barn, and after a while he cleaned up the floor and fed the stuff to his stock, and he lost several head.

Dr. Bolser: We heard of that case, and another, three or four months ago, in Vigo County, where the farmer fed off the barn floor in the same way. He had not cleaned the barn for fifteen years. When I got there he had lost five horses and two more were sick with spinal meningitis. I had him sweep and clean and disinfect the place.

Mr. Mitchell: What do you think of soft corn feeding?

Dr. Bolser: I have the same opinion of soft corn feeding that I have of watering stock out of stagnant pools. There is an accumulation of mould and fungi on the soft corn that is very dangerous.

Mr. Nelson: Do you regard the running brooks of Indiana as unwholesome for stock in comparison with the driven or drilled wells?

Dr. Bolser: Yes, sir.

Mr. Nelson: I have been raising stock for forty years; I have a farm with a running brook, and have never lost an animal on my place that has been watered in that running brook. I have lost stock that had been kept in the barn, where they were watered from a well.

Dr. Bolser: Was that well a driven well at the barn?

Mr. Nelson: No, sir.

Dr. Bolser: Any well that is dug and is near a barn is very likely to be unwholesome. I knew of one livery where fifteen horses died of spinal meningitis. I went there and the barn was clean, the food pure and the horses were well cared for. We investigated the well and found that a rat had dug a hole leading from the manure pile to the well and the drainage had run through that into the well.

I think a good spring brook is more healthy than a well that has been dug anywhere near a barn.

Mr. Nelson: My running well is fed by springs, and I would not give it for any deep well in the world.

Mr. J. D. Williams: I would like to ask the Doctor if he considers tuberculosis contagious?

Dr. Bolser: I am thoroughly satisfied that it is.

Mr. Gifford: In regard to pure water for swine, I would like to ask if dish-water and other house slops are fit to feed to hogs?

Dr. Bolser: I do not think they are unwholesome, from the fact that usually the water has been boiled, and everything on the dishes has been subjected to hot water, and I do not think there is a subject of disease there. Some of the soaps used might be injurious to the stock.

Mr. Gifford: Do you not think that slops that have been put in barrels and allowed to sour are injurious?

Dr. Bolser: Yes; especially if there is whey or milk with it.

Does the Doctor not intend to convey the idea that tuberculosis is infectious and not contagious?

Dr. Bolser: I think the line is so narrow between them that it is not worth while to argue it.

Mr. Thompson: I notice that the Doctor recommends dipping sheep in the stock yards before they leave. Would that prevent them from getting the scab in the cars they are shipped in?

Dr. Bolser: If they are shipped at once, before they dry, I think it will prevent them getting it; but if they dry and the wool is dried they will take it.

Mr. Thompson: Do you not think that the cars ought to be disinfected?

Dr. Bolser: Yes, sir; we always recommend that.

Report of Committee to Consider the President's Address read by the Chairman.

Indianapolis, Ind., January 4, 1899.

To the Members of the Delegate State Board of Agriculture:

Gentlemen—Your committee to whom was referred the address of Hon. Charles Downing, President of the State Board of Agriculture, have had the same under careful consideration, and beg leave to report that all the matters therein contained meet with the most cordial approval and indorsement of your committee.

MASON J. NIBLACK,
AARON JONES,
ROBERT MITCHELL,
SID CONGER,
J. E. McDONALD.

Report of committee concurred in.

Report of committee appointed at the meeting of the Board, September 17, 1898, to draft resolutions on the death of the Hon. Claude Matthews, read by Hon. James E. McDonald, chairman of committee:

WHEREAS, The members of the Delegate Board note with feelings of most profound regret and sorrow the absence from its meeting for the first time in many years of the Hon. Claude Matthews, the distinguished ex-Governor of this great commonwealth.

WHEREAS, We recognize that in his death the State and the country at large have suffered a loss that is fully appreciated and felt by all. His service to the State, so faithfully and so well performed, won him the respect and confidence of every citizen. All respected him as a public servant of incorruptible and unquestioned integrity and a citizen and public official who reflected great credit upon his adopted State.

WHEREAS, Claude Matthews was, in all of the relations of the world, an elevated character and an upright man, whose sterling qualities of mind and heart bore practical fruit. His genius for the affairs of the farm and of the people marked him as a leader and made him useful and valuable to his country and his countrymen. He was an example worthy of emulation by the youth, as well as by age.

Resolved, That we tender his bereaved wife and family our deepest sympathy in their great loss and sorrow.

Resolved, That this body, by a rising vote, acknowledge the great loss to the State Board of Agriculture and to the State in the death of our eminent fellow-citizen and co-worker.

Resolved, That a copy of these resolutions be transmitted to the widow, and that they be spread upon the records of this Board.

J. E. McDONALD,
MASON J. NIBLACK,
AARON JONES,

Committee.

Report of committee adopted by a rising vote.

Report of Committee on Credentials read.

We, the Committee on Credentials, beg leave to make the following report as to representation at this meeting:

Delegates.

1. Angola Fair Francis McCartney.
2. Bainbridge Fair J. C. Bridges.
3. Boonville Fair Clamor Pelzer.
4. Bridgeton Fair H. D. Collings.
5. Boswell Fair Mortimer Levering.
6. Bedford Fair Geo. W. McDaniel.
7. Bloomington Fair C. R. Worrall.
8. Chrisney Fair J. W. McKinster.
9. Columbus Fair D. W. Heogy.
10. Crawfordsville Fair M. B. Waugh.
11. Chrisney Fair John C. Haines.
12. Covington Fair Mark Rogers.
13. Crown Point Fair A. A. Bibler.
14. Frankfort Fair James A. Hedgecock.
15. Elwood Fair Frank E. De Hority.
16. Fairmount Fair Jeremiah Hartley.
17. Franklin Fair S. W. Dungan.
18. Greenfield Fair Chas. Downing.
19. Grange Jubilee Fair D. P. Monroe.
20. Hagerstown Fair Knobe Porter.
21. Kokomo Fair John M. Leach.
22. Kendallville Fair D. K. Hitchcock.
23. Laporte Fair J. Vene Dorland.
24. Lafayette Fair W. M. Blackstock.
25. Lawrenceburg Fair H. L. Nowlin.
26. Lebanon Fair C. W. Scott.
27. Ligonier Fair J. L. Dunning.
28. Marion Fair J. L. Bradford.
29. Middeltown Fair F. A. Wesehart.
30. Marion County Fair W. B. Flick.
31. Muncie Fair M. S. Claypool.
32. North Manchester Fair H. B. Howland.
33. Newton Fair A. C. Schermerhorn.
34. Princeton Fair Robert Mitchell.
35. Rochester Fair Dr. A. H. Robbins.
36. Rushville Fair Robert Hinchman.
37. Sheridan Fair Calvin Studivant.
38. Shelbyville Fair Sid Conger.

- 39. Salem Fair W. W. Stevens.
- 40. Swazee Fair Jeremiah Hartley.
- 41. Terre Haute Fair Wm. T. Beauchamp.
- 42. Warren Fair Dr. J. Good.
- 43. Wayne County Horticultural Society..... Jesse C. Stevens.
- 44. Evansville Fair Robert Mitchell.
- 45. Portland Fair L. L. Gilpin.
- 46. New Castle Fair R. A. Smith.
- 47. Vincennes Fair Mason J. Niblack.
- 48. Winchester Fair Allen Beeler.
- 49. Johnson County Fair John Tilson.
- 50. Noble County Horticultural Society..... D. K. Hitchcock.
- 51. Olympic Park Association..... Geo. H. Gifford.
- 52. Kentland Fair H. A. Strohn.
- 53. Plainfield Agricultural and Horticultural Society....

John Morgan.

A. A. BIBLER,

W. F. HULET,

J. L. DUNNING,

Committee.

Report of Committee on Credentials approved.

The President announced that the meeting would now proceed to the election of the members of the Board to be elected at this meeting.

It was moved and seconded that the Secretary be instructed to cast the vote of the convention for H. L. Nowlin as member for the Fifth District. Mr. Kennedy was so instructed, and announced that he cast the entire number of votes as given by the Committee on Credentials, fifty-three, for Mr. Nowlin, who was declared duly elected.

A motion was made and seconded that the Secretary be instructed to cast the vote of the convention for Knobe Porter as member for the Sixth District. Mr. Kennedy was so instructed, and cast the vote of the convention for Mr. Porter, who was declared duly elected.

A motion was made and seconded that the Secretary be instructed to cast the vote of the convention for Mr. Charles Downing for member for the Eighth District. Mr. Kennedy was so instructed,

and cast the vote of the convention, and Mr. Downing was declared elected.

There being two candidates nominated for member for the Ninth District, Mr. F. A. Nave, of Attica, and Mr. W. T. Beauchamp, of Terre Haute, ballots were cast.

Dr. Downing appointed Mr. McDaniel and Mr. Worrell tellers, and Mr. Stevens and Mr. Risk to collect the ballots.

Mr. Nave received 23 votes and Mr. Beauchamp 27, and Mr. Beauchamp was declared duly elected. Fifty-one votes were cast; twenty-six were necessary to elect.

In the Tenth District the candidates nominated were John L. Davis and W. W. Morgan. Fifty-one votes were cast, Mr. Davis receiving 27 and Mr. Morgan 23. Mr. Davis was declared duly elected.

Motion was made and seconded that the Secretary be instructed to cast the vote of the convention for Mr. M. S. Claypool for member from the Eleventh District. Mr. Kennedy cast the vote, and Mr. Claypool was declared duly elected.

A motion was made, seconded and carried, that the Secretary be instructed to cast the vote of the convention for Mortimer Levering for member from the Twelfth District. Mr. Kennedy cast the vote, and Mr. Levering was declared duly elected.

For member of the Thirteenth District there were three candidates nominated, John L. Thompson, George A. Gifford and Joshua Strange.

On the first ballot the result was as follows: Mr. Thompson, 24; Mr. Gifford, 19; Mr. Strange, 7.

On the second ballot: Mr. Thompson, 24; Mr. Gifford, 22; Mr. Strange, 5.

On the third ballot: Mr. Thompson and Mr. Gifford only were balloted for, Mr. Strange having withdrawn his name. Mr. Thompson received 26 ballots and Mr. Gifford 26.

There being but 51 voting members present, a motion was made that when a member's name was called he should come forward and deposit his ballot on the desk. Motion seconded and carried.

On the fourth ballot 50 votes were cast, Mr. Thompson receiving 26 and Mr. Gifford 24. Mr. Thompson was declared duly elected.

Motion made that the Delegate Board adjourn. Motion seconded and carried.

MEETING OF THE STATE BOARD OF AGRICULTURE,
JANUARY 4, 1899.

At the call of the President of the Board, the members of the State Board of Agriculture met in the office of the Secretary, the President in the chair, and all members present.

The motion of Mr. Thompson, that a committee of three be appointed to appraise the damage to the grounds on account of the occupancy of the grounds by the soldiers while in camp, prevailed.

Committee appointed—Messrs. Thompson and Howland; upon request Mr. Downing agreed to serve as the third member of the committee.

The motion of Mr. Jones, that the Board take a recess until 8 p. m., prevails.

EVENING SESSION.

The President announced that the business of the old Board was completed, and upon motion the Board adjourned *sine die*.

CHARLES DOWNING,
President.

CHARLES F. KENNEDY,
Secretary.

CEREAL AND ROOT CROP STATISTICS FOR 1898.

COMPILED BY J. B. CONNER, CHIEF OF STATE BUREAU OF STATISTICS FOR INDIANA.

WHEAT.

The yield of Indiana compared for ten years :

YEAR.	Bushels.	Acres.	Average Bushels per Acre.
1898.	51,001,080	3,012,332	16.9
1897.	37,769,875	2,479,875	15.23
1896.	24,574,853	2,852,230	8.5
1895.	22,674,101	2,728,210	8.03
1894.	50,792,620	2,540,424	19.56
1893.	38,114,708	2,550,014	14.87
1892.	42,126,144	2,654,645	15.86
1891.	58,305,796	2,891,922	20.09
1890.	28,852,346	2,821,129	10.5
1889.	41,541,570	2,773,883	14.9

The greatest producing counties for 1898 :

COUNTY.	Bushels.	Bushels per Acre.
Posey	1,164,294	18
Kosciusko	1,136,485	19
Gibson.	1,098,675	15
Rush.	1,054,785	19
Knox	1,015,800	15

Greatest average yield per acre :

COUNTY.	Acres Sown	Bushels per Acre.
Dekalb.	27,830	21

CORN.

The yield in Indiana compared for ten years:

YEAR.	Bushels.	Acres.	Average Bushels per Acre.
1898.	145,501,404	3,915,131	37.16
1897.	125,499,401	4,101,665	30.06
1896.	148,578,898	4,005,690	37.09
1895.	132,105,988	3,706,146	35.37
1894.	95,205,132	3,526,116	27
1893.	84,045,722	3,488,822	24.09
1892.	111,217,463	3,563,337	31.2
1891.	125,092,649	3,637,927	34.33
1890.	87,092,513	3,446,459	25.2
1889.	106,542,161	3,418,051	31

The greatest producing counties for 1898:

COUNTY.	Bushels.	Yield per Acre.
Benton.	4,154,000	40
Tippecanoe.	3,776,405	37
Montgomery	3,608,360	49
Clinton.	3,049,830	47
Madison	2,884,870	43

Greatest average yield per acre:

COUNTY.	Acres.	Bushels per Acre.
Howard	44,284	50

OATS.

The yield in Indiana compared for ten years :

YEAR.	Bushels.	Acres.	Average Bushels per Acre.
1898.	33,490,424	1,162,451	28.81
1897.	35,574,823	1,208,697	29.4
1896.	23,689,234	1,180,057	20.07
1895.	24,601,831	1,098,700	22.5
1894.	38,236,019	1,202,422	31.8
1893.	32,015,229	1,206,301	26.54
1892.	27,369,719	1,103,958	24.72
1891.	23,123,189	897,952	25.75
1890.	15,556,207	1,119,398	13.2
1889.	28,710,935	950,231	30.2

The greatest producing counties for 1898 :

COUNTY.	Bushels.	Yield per Acre.
Benton	2,005,650	35
Newton	1,415,456	32
White	1,357,692	28
Allen	1,293,064	38
Jasper	1,257,440	29

Greatest average yield per acre :

COUNTY.	Acres.	Bushels per Acre.
Lake	26,079	41

BARLEY.

The yield in Indiana compared for ten years:

YEAR.	Bushels.	Acres.	Average Bushels per Acre.
1898.	136,234	11,397	11.96
1897.	127,899	7,066	18.1
1896.	296,914	16,045	18.5
1895.	659,058	32,222	19.8
1894.	255,134	10,738	23.76
1893.	214,544	10,621	20.2
1892.	231,842	10,810	21.44
1891.	467,773	21,388	21.87
1890.	387,802	22,745	17
1889.	416,325	19,825	21

The greatest producing counties for 1898:

COUNTY.	Bushels.	Yield per Acre.
Dekalb.	36,000	30
Allen	15,984	27
Shelby	9,516	26
Noble	6,720	30
Steuben	6,272	32

Greatest average yield per acre:

COUNTY.	Acres.	Bushels per Acre.
Grant	181	33

RYE.

The yield in Indiana compared for ten years :

YEAR.	Bushels.	Acres.	Average Bushels per Acre.
1898.	948,056	62,084	15.28
1897.	1,921,938	135,680	12.9
1896.	4,082,800	369,409	11.06
1895.	1,972,190	148,899	13.2
1894.	1,147,037	59,835	19.17
1893.	875,949	59,751	14.66
1892.	927,843	62,976	14.73
1891.	808,148	44,845	18.2
1890.	784,191	58,785	13.3
1889.	871,216	54,451	16

The greatest producing counties for 1898 :

COUNTY.	Bushels.	Bushels per Acre.
Porter	72,534	14
Elkhart	54,620	20
Laporte	52,592	19
Starke	42,624	12
Jasper	40,530	14

Greatest average yield per acre :

COUNTY.	Acres.	Bushels per Acre.
Montgomery	468	24

CLOVER HAY.

The yield in Indiana compared for ten years:

YEAR.	Tons.	Acres.	Average Tons per Acre.
1898.	1,695,630	1,033,407	1.64
1897.	Not given.	1,007,831	Not given.
1896.	1,006,901	713,555	1.41
1895.	1,185,267	1,098,642	1.08
1894.	1,672,553	1,087,373	1.54
1893.	1,793,768	1,087,132	1.65
1892.	1,910,852	1,174,341	1.62
1891.	2,109,814	1,208,672	1.75
1890.	2,057,188	1,196,040	1.7
1889.	2,349,528	1,174,764	2

TIMOTHY HAY.

The yield in Indiana compared for ten years:

YEAR.	Tons.	Acres.	Average Tons per Acre.
1898.	1,802,579	1,175,390	1.56
1897.	Not given.	1,150,586	Not given.
1896.	1,650,252	1,243,969	1.32
1895.	1,003,788	1,451,272	.62
1894.	1,644,509	1,133,226	1.46
1893.	1,580,269	1,128,764	1.4
1892.	1,814,835	1,209,890	1.5
1891.	2,034,242	1,257,758	1.6
1890.	2,112,457	1,242,622	1.7
1889.	1,823,047	1,215,365	1.5

WHEAT AND CORN.

Area and Production for 1898.

COUNTIES.	Wheat, 1898.			Corn, 1898.		
	Acres.	Bushels.	Yield per Acre.	Acres.	Bushels.	Yield per Acre.
Adams	25,581	409,296	16	38,107	1,227,638	34
Allen	40,232	804,640	20	52,130	1,876,680	36
Bartholomew	52,862	634,344	12	49,553	1,833,461	37
Benton	12,224	17,136	14	103,860	4,154,000	40
Blackford	9,284	120,692	13	19,257	770,280	40
Boone	51,668	826,688	16	63,429	2,473,731	39
Brown	8,777	105,324	12	15,228	487,296	32
Carroll	50,483	1,009,660	20	45,987	1,793,493	39
Cass	47,972	911,468	19	46,978	1,832,142	39
Clark	19,719	374,661	19	28,587	886,197	31
Clay	20,180	343,060	17	36,634	1,172,388	32
Clinton	57,760	924,160	16	64,890	3,049,830	47
Crawford	11,816	153,608	13	21,193	614,597	29
Daviess	43,597	784,746	18	47,738	1,623,092	34
Dearborn	21,315	341,040	16	20,044	621,364	31
Decatur	38,346	690,228	18	41,640	1,582,320	38
DeKalb	27,830	584,430	21	28,348	1,077,224	38
Delaware	43,132	776,376	18	68,517	2,740,680	40
Dubois	38,244	650,148	17	26,396	871,068	33
Elkhart	52,574	893,768	17	36,226	1,376,588	38
Fayette	25,939	492,841	19	24,468	856,350	35
Floyd	7,312	124,304	17	9,038	307,292	34
Fountain	35,498	532,470	15	52,725	1,845,375	35
Franklin	31,912	542,504	17	31,922	1,181,114	37
Fulton	38,537	770,740	20	37,772	1,510,880	40
Gibson	73,245	1,098,675	15	51,183	1,647,866	32
Grant	33,557	604,026	18	54,239	2,169,560	40
Greene	23,546	353,190	15	55,295	1,990,620	36
Hamilton	45,994	919,880	20	60,661	2,183,796	36
Hancock	36,165	650,970	18	53,654	2,192,814	41
Harrison	42,862	771,516	18	34,746	1,077,126	31
Hendricks	37,534	525,476	14	53,726	2,149,040	40
Henry	46,468	697,020	15	51,541	2,113,181	41
Howard	34,118	648,242	19	44,284	2,214,200	50
Huntington	37,490	674,820	18	41,046	1,518,702	37
Jackson	31,288	500,608	16	43,255	1,397,650	30
Jasper	4,166	45,862	11	67,372	2,425,392	36
Jay	23,754	380,064	16	45,380	1,588,300	35
Jefferson	22,274	334,110	15	30,104	963,628	32
Jennings	20,097	241,164	12	29,588	946,816	32

COUNTIES.	Wheat, 1898.			Corn, 1898.		
	Acres.	Bushels.	Yield per Acre.	Acres.	Bushels.	Yield per Acre.
Johnson	44,502	749,984	17	45,417	1,998,348	44
Knos.	67,720	1,015,800	45	64,052	2,818,238	44
Kossiusko	59,815	1,136,485	19	44,089	1,851,738	42
Lagrange	44,927	808,686	18	31,373	1,192,174	38
Lake	1,699	30,582	18	35,004	1,365,156	39
Laporte	48,177	867,186	18	49,292	1,528,052	31
Lawrence	12,868	187,284	13	26,166	811,146	31
Madison	47,479	949,580	20	67,090	2,884,870	43
Marion	32,845	591,210	18	42,079	1,767,318	42
Marshall	47,391	900,429	19	39,031	1,405,116	36
Martin	13,062	206,992	16	22,244	667,329	30
Miami	96,313	617,321	17	39,541	1,621,181	41
Monroe	11,245	179,920	16	20,414	673,662	33
Montgomery	55,715	891,440	16	73,640	3,608,360	49
Morgan	28,514	456,224	16	40,570	1,460,520	36
Newton	1,728	20,736	12	71,606	2,434,672	34
Noble	49,577	991,540	20	34,463	1,481,909	43
Ohio	7,549	83,039	11	6,477	194,310	30
Orange	13,799	220,784	16	28,989	753,714	26
Owen	11,672	128,392	11	21,131	760,716	36
Parke	34,386	515,790	15	45,117	1,669,329	37
Perry	19,361	309,776	16	22,532	790,370	35
Pike	40,761	652,176	16	32,586	1,238,268	38
Porter	10,974	197,532	18	35,793	1,431,720	40
Posey	64,683	1,164,294	18	45,748	1,738,424	38
Pulaski	17,558	316,044	18	48,787	1,707,545	35
Putnam	30,387	486,192	16	44,896	1,708,124	38
Randolph	41,119	699,023	17	63,759	2,231,566	35
Ripley	28,227	423,405	15	35,342	1,060,260	30
Rush	55,515	1,054,785	19	56,321	2,421,803	43
Scott	16,707	250,605	15	18,303	457,575	25
Shelby	59,650	1,014,050	17	64,472	2,256,520	35
Spencer	51,619	825,904	16	39,232	1,411,992	36
Starke	5,760	69,120	12	20,501	717,535	35
Steuben	27,456	549,120	20	25,461	1,043,901	41
St. Joseph	55,981	839,715	15	38,679	1,237,728	32
Sullivan	33,680	538,880	16	51,583	2,063,320	40
Switzerland	10,743	161,145	15	12,821	384,630	30
Tippecanoe	58,885	1,000,705	17	102,065	3,776,405	37
Tipton	27,668	470,356	17	39,628	1,505,964	38
Union	21,610	345,760	16	20,244	728,784	36
Vanderburgh	34,700	589,900	17	23,322	979,524	42
Vermillion	25,047	400,752	16	36,993	1,220,769	33
Vigo	31,624	442,736	14	72,427	2,390,091	33
Wabash	48,267	917,973	19	40,075	1,562,925	39
Warren	15,474	201,162	13	68,174	2,590,612	38
Warrick	56,333	957,661	17	41,748	1,294,188	31
Washington	21,499	386,982	18	38,391	1,228,512	32
Wayne	42,148	758,664	18	49,492	1,930,188	39
Wells	28,947	434,205	15	41,923	1,551,151	37
White	17,251	258,765	15	83,379	2,584,749	31
Whitley	27,183	489,294	18	27,894	1,059,972	38
Total	3,012,332	51,001,080		3,915,131	145,501,404	

WHEAT GRAPHIC.

Showing by Counties the Largest Wheat Producers.

[See Marginal Explanation.]



Showing by Counties the Largest Corn Producers.

Map of Indiana counties showing population distribution by county in 1950. The map uses five shades of gray to represent population ranges. The legend indicates:

- Dark gray: OVER 300,000 Bu.
- Medium-dark gray: OVER 200,000 Bu.
- Medium-light gray: OVER 100,000 Bu.
- Light gray: OVER 50,000 Bu.
- White: LESS THAN 50,000 Bu.

OATS AND RYE.

Area and Production for 1898.

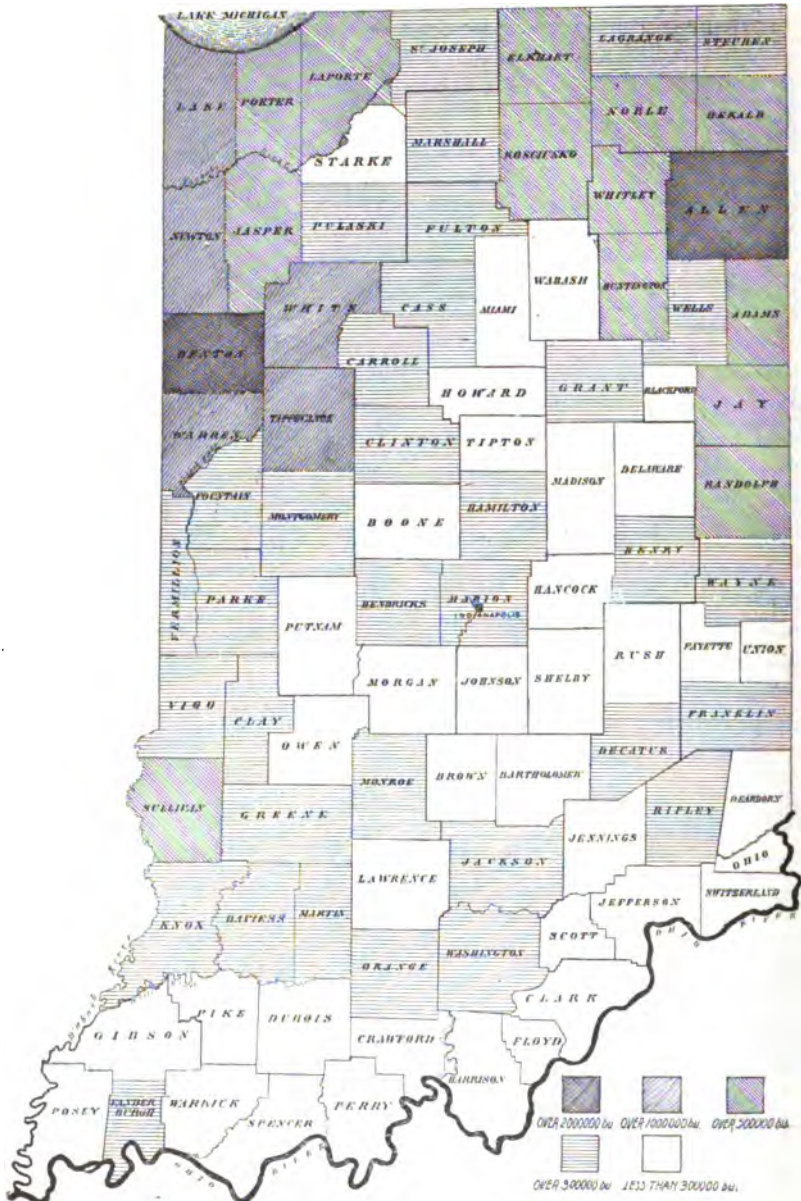
COUNTIES.	Oats, 1898.			Rye, 1898.		
	Acres.	Bushels.	Yield per Acre.	Acres.	Bushels.	Yield per Acre.
Adams	16,631	565,454	34	297	5,049	17
Allen	31,628	1,293,064	38	1,191	21,438	18
Bartholomew	5,080	137,160	27	226	3,390	15
Benton	71,590	2,505,650	35	140		
Blackford	5,373	134,425	25	774	7,740	10
Boone	6,668	180,036	27	709	7,090	10
Brown	3,318	72,996	22	215	2,365	11
Carroll	6,376	150,248	23	195	3,510	18
Cass	9,329	294,470	30	647	9,685	15
Clark	4,346	95,612	22	159	2,703	17
Clay	10,395	228,690	22	78	936	12
Clinton	9,627	259,929	27	373	6,341	17
Crawford	7,755	181,375	25	42	546	13
Daviess	11,939	298,475	25	204	3,284	16
Dearborn	6,475	90,650	14	492	6,396	13
Decatur	5,000	165,000	33	107	1,819	17
Dekalb	18,999	645,966	34	1,064	17,918	17
Delaware	8,018	288,644	36	615	11,688	19
Dubois	17,573	474,471	27	52	803	16
Elkhart	14,553	494,802	34	2,731	54,620	20
Fayette	2,041	65,312	32	150	2,250	15
Floyd	2,319	62,613	27	249	4,482	18
Fountain	14,338	329,774	23	318	5,068	16
Franklin	7,112	156,464	22	794	9,538	21
Fulton	9,096	281,976	31	700	10,500	15
Gibson	4,621	106,283	23	209	3,553	17
Grant	10,131	334,323	33	899	19,979	21
Greene	12,520	250,400	20	158	2,054	13
Hamilton	8,203	270,699	33	634	8,876	14
Hancock	7,091	205,639	29	365	5,475	15
Harrison	9,466	179,854	19	487	6,818	14
Hendricks	6,910	193,480	28	88	456	12
Henry	4,870	170,450	35	333	6,993	21
Howard	6,351	209,583	33	244	3,172	13
Huntington	20,455	654,560	32	395	6,320	16
Jackson	13,861	291,081	21	416	4,992	12
Jasper	43,360	1,257,440	29	2,895	40,530	14
Jay	19,861	556,108	28	1,039	12,468	12
Jefferson	13,161	263,220	20	462	5,082	11
Jennings	33,401	835,025	25	227	2,724	12

COUNTIES.	Oats, 1898.			Rye, 1898.		
	Acres.	Bushels.	Yield per Acre.	Acres.	Bushels.	Yield per Acre.
Johnson	1,824	51,072	28	52	936	18
Knox	5,787	167,828	29	92	1,472	16
Kosciusko	15,723	503,136	32	1,518	22,770	15
Lagrange	7,196	251,930	36	2,522	33,186	13
Lake	26,079	1,069,239	41	1,270	29,210	23
Laporte	16,990	492,710	29	2,768	52,592	19
Lawrence	11,373	272,952	24	242	3,146	13
Madison	9,189	266,481	29	801	12,015	15
Marion	8,747	201,180	23	269	4,842	18
Marshall	12,087	374,697	31	2,064	30,960	15
Martin	9,010	207,290	23	158	1,264	8
Miami	7,462	246,246	33	310	4,960	16
Monroe	5,897	176,010	30	76	968	13
Montgomery	29,340	674,620	23	468	11,232	24
Morgan	4,479	152,286	34	192	2,680	15
Newton	44,233	1,415,456	32	1,369	19,166	14
Noble	14,033	463,089	33	1,145	25,190	22
Ohio	660	6,600	10	382	4,812	11
Orange	15,116	317,436	21	54	540	10
Owen	8,089	210,314	26	190	2,850	16
Parke	9,727	262,629	27	310	3,720	12
Perry	5,785	121,485	21	189	2,935	15
Pike	6,237	155,925	25	368	5,152	14
Porter	24,598	934,724	38	5,181	72,534	14
Posey	2,448	68,544	28	45	900	20
Pulaski	24,071	722,130	30	2,632	31,584	12
Putnam	7,471	209,188	28	200	2,200	11
Randolph	14,542	378,082	26	654	10,464	16
Ripley	7,079	189,896	24	770	11,550	15
Rush	2,774	99,864	36	67	1,340	20
Scott	1,710	29,070	17	29		
Shelby	2,415	60,375	25	83	429	13
Spencer	7,608	197,808	26	165	2,145	13
Starke	5,761	195,874	34	3,552	42,824	12
Stauben	6,983	286,221	41	1,135	19,295	17
St. Joseph	12,948	440,232	34	2,520	37,900	15
Sullivan	12,453	348,694	28	310	3,100	10
Switzerland	3,177	41,301	13	1,552	20,176	13
Tippecanoe	36,730	720,600	20	463	8,334	18
Tipton	2,231	69,980	30	227	2,951	13
Union	1,504	51,136	34	92	2,024	22
Vanderburgh	2,197	59,319	27	53	689	13
Vermillion	9,539	277,631	29	131	1,572	12
Vigo	11,455	208,190	18	427	6,405	15
Wabash	16,148	597,476	37	510	9,180	18
Warren	31,906	787,932	22	189	2,268	12
Warrick	6,718	100,770	25	254	5,080	20
Washington	16,895	405,480	24	156	1,716	11
Wayne	13,859	443,488	32	263	5,260	20
Wells	13,021	403,650	31	720	10,800	15
White	48,489	1,357,692	28	1,404	28,252	13
Whitley	15,845	554,575	35	218	3,488	16
Total	1,162,451	33,490,424		62,084	948,056	

OATS GRAPHIC.

Showing by Counties the Largest Oats Producers.

[See Marginal Explanation.]



BARLEY AND BUCKWHEAT.

Area and Production for 1898.

COUNTIES.	Barley for 1898.			Buckwheat for 1898.		
	Acres.	Bushels.	Yield per Acre.	Acres.	Bushels.	Yield per Acre.
Adams.	366	1,830	25	120	2,400	20
Allen.	592	15,984	27	169	3,211	19
Bartholomew.	25	625	25	20	400	20
Benton.				50		
Blackford.	110	1,650	15	17	136	8
Boone.	50					
Brown.	41			7	140	20
Carroll.	3			4		
Cass.	15			22	440	20
Clark.	46	1,150	25	5		
Clay.	189			23	460	20
Clinton.	350			21	630	30
Crawford.	1			9		
Davies.	536					
Dearborn.	267	5,073	19	12	240	20
Decatur.	10	150	15	5		
DeKalb.	1,200	36,000	30	129	1,806	14
Delaware.	173	4,325	25	5	125	25
Dubois.	76	1,748	23			
Elkhart.	790			356	3,560	10
Fayette.						
Floyd.	22	440	20			
Fountain.	44					
Franklin.	90	2,700	30	34	340	10
Fulton.	101			24	288	12
Gibson.	440			76		
Grant.	181	5,973	33	12	180	15
Greene.	1			6	180	30
Hamilton.	42	420	10	1		
Hancock.	53	1,590	30	7		
Harrison.	118	2,006	17			
Hendricks.				6		
Henry.	53	1,080	20	1		
Howard.	63	1,575	25	35		
Huntington.	56			86	1,032	12
Jackson.	11			36		
Jasper.	207			76	1,748	23
Jay.	145	2,900	20	63	1,260	20
Jefferson.	55	1,210	22	111	2,533	23
Jennings.	4			141	2,256	16

COUNTIES.	Barley for 1896.			Buckwheat for 1896.		
	Acres.	Bushels.	Yield per Acre.	Acres.	Bushels.	Yield per Acre.
Johnson	12					
Knox	21	690	30	7		
Kosciusko	81			54	648	12
Lacrange	153			35	595	17
Lake	46			175	3,850	22
Laporte	353			234	4,212	18
Lawrence	183			2		
Madison	52	1,144	22	3	51	17
Marion	51	1,020	20			
Marshall	169			33	957	29
Martin	14			44	484	11
Miami	53	954	18	31	485	15
Monroe	22	220	10	7	119	17
Montgomery	52			16		
Morgan	25			38		
Newton	319			60	1,800	30
Noble	224	6,720	30	77	1,155	15
Ohio	14					
Orange	9					
Owen	14			4		
Parke						
Perry	61	1,220	20	10		
Pike	1	20	20			
Porter	55			188	2,820	15
Posey	71	1,917	27	4		
Pulaski	4			124	1,984	16
Putnam	50			3		
Randolph				30	510	17
Ripley	16			4	40	10
Rush	24			6		
Scott	6			21	210	10
Shelby	366	9,516	26			
Spencer	2	60	30	10		
Starke	403	3,827	9	422	11,816	28
Steuben	196	6,272	32	111	2,997	27
St. Joseph	10	150	15	55		
Sullivan	223			2		
Switzerland	210	3,990	19	4	60	15
Tippecanoe	72			29	580	20
Tipton	16			1	11	11
Union	29					
Vanderburgh	25					
Vermillion	102					
Vigo	18	270	15	1	25	25
Wabash	72	2,160	30	20		
Warren	41			18		
Warrick	10					
Washington	181	4,163	23			
Wayne	510			1	25	25
Wells	164	3,772	23	20	340	17
White	71			86	1,118	13
Whitley				57	969	17
Total	11,397	136,234		3,733	61,206	

TIMOTHY AND CLOVER HAY.

Area and Production for 1898.

COUNTIES.	Timothy Hay for 1898.			Clover Hay for 1898.		
	Acres.	Tons.	Yield per Acre	Acres.	Tons.	Yield per Acre.
Adams	16,513	21,632.03	1.31	12,307	19,196.92	1.56
Allen	33,577	54,394.71	1.62	17,421	18,986.23	1.63
Bartholomew	13,622	18,934.58	1.39	20,917	31,993.83	1.53
Benton	15,066	16,723.26	1.11	2,355	3,132.15	1.33
Blackford	7,013	10,519.60	1.50	2,972	5,944.00	2
Boone	15,017	26,279.75	1.75	13,799	33,856.29	1.71
Brown	9,283	13,924.50	1.50	3,305	4,957.50	1.50
Carroll	7,546	10,886.24	1.44	19,177	22,820.63	1.19
Cass	8,938	14,582.70	1.65	18,576	33,365.60	1.85
Clark	10,002	14,702.94	1.47	6,422	11,366.94	1.77
Clay	21,064	34,123.68	1.62	5,819	10,183.25	1.75
Clinton	12,441	23,015.85	1.85	23,005	46,470.10	2.02
Crawford	6,890	14,882.40	2.16	4,376	9,102.08	2.08
Daviess	13,002	26,004.00	2	9,106	23,493.48	2.58
Dearborn	21,022	21,022.00	1	3,836	4,486.96	1.17
Decatur	13,809	19,808.78	1.42	15,206	26,610.50	1.75
DeKalb	17,988	27,521.64	1.53	14,929	22,393.50	1.50
Delaware	16,592	24,390.24	1.47	12,254	20,096.56	1.64
Dubois	9,906	12,877.80	1.30	12,453	18,679.50	1.50
Elkhart	15,781	22,352.33	1.43	13,318	20,509.72	1.54
Fayette	5,908	8,389.36	1.42	12,791	24,942.45	1.95
Floyd	4,010	8,020.00	2	2,141	6,059.03	2.83
Fountain	10,902	17,225.16	1.58	12,273	22,091.40	1.80
Franklin	10,152	14,314.32	1.41	13,396	17,146.88	1.28
Fulton	6,610	12,360.70	1.87	12,361	21,631.75	1.75
Gibson	7,935	12,775.35	1.61	15,764	39,321.04	1.86
Grant	19,040	33,320.00	1.75	14,874	23,402.18	1.57
Greene	21,802	37,906.76	1.28	9,270	14,924.70	1.61
Hamilton	13,315	19,972.50	1.50	15,876	23,814.00	1.50
Hancock	8,632	11,752.16	1.38	15,773	21,766.74	1.38
Harrison	11,295	19,201.50	1.70	12,511	22,519.80	1.80
Hendricks	15,564	23,369.32	1.63	15,825	27,693.75	1.75
Henry	10,109	16,275.49	1.61	20,040	34,468.80	1.72
Howard	9,178	13,767.00	1.50	15,848	25,366.80	1.60
Huntington	16,976	27,161.60	1.60	15,406	25,111.78	1.63
Jackson	16,010	27,056.90	1.69	8,127	16,741.62	2.06
Jasper	15,565	21,168.40	1.36	808	1,818.00	2.25
Jay	20,233	25,291.25	1.25	11,217	17,722.86	1.58
Jefferson	9,656	12,070.00	1.25	7,401	11,397.54	1.54
Jennings	17,332	20,625.08	1.19	8,275	8,275.00	1

COUNTIES.	Timothy Hay for 1898.			Clover Hay for 1898.		
	Acres.	Tons.	Yield per Acre.	Acres.	Tons.	Yield per Acre.
Johnson	8,327	12,490.50	1.50	18,451	28,783.56	1.56
Knox	7,820	14,310.60	1.83	14,640	34,111.20	2.33
Kosciusko	12,765	20,955.80	1.72	18,874	29,254.70	1.55
Lagrange	11,070	17,490.60	1.58	16,538	26,180.24	1.58
Lake	38,931	60,343.05	1.55	872	1,969.04	1.57
Laporte	11,025	16,537.50	1.50	6,812	10,558.60	1.55
Lawrence	13,756	18,708.16	1.37	7,143	10,000.20	1.40
Madison	16,039	25,178.69	1.57	16,855	28,822.05	1.71
Marion	19,758	28,673.30	1.35	11,148	18,951.60	1.70
Marshall	8,266	15,622.74	1.89	16,284	27,845.64	1.71
Martin	8,898	10,321.68	1.16	5,220	7,830.00	1.50
Miami	10,386	17,760.06	1.71	15,295	27,278.05	1.79
Monroe	15,342	28,075.86	1.83	4,547	11,731.28	2.58
Montgomery	16,881	28,022.46	1.66	19,428	37,301.76	1.92
Morgan	11,135	18,484.10	1.66	9,753	19,993.65	2.05
Newton	10,052	12,565.00	1.25	2,443	2,443.00	1
Noble	11,076	19,936.80	1.80	20,376	23,636.16	1.16
Ohio	5,901	4,425.75	.75	1,100	2,266.00	2.06
Orange	9,781	14,671.50	1.50	6,494	10,780.04	1.66
Owen	19,358	29,617.74	1.53	4,776	8,453.52	1.77
Parke	12,690	25,380.00	2	9,671	14,506.50	1.50
Perry	6,124	9,166.00	1.50	6,439	15,711.16	2.44
Pike	8,351	15,699.88	1.88	8,142	13,759.98	1.69
Porter	22,110	34,591.60	1.56	4,505	9,235.25	2.05
Posey	4,860	8,636.60	1.81	12,754	20,151.32	1.58
Pulaski	7,958	11,937.00	1.50	3,282	5,284.02	1.61
Putnam	17,163	26,945.91	1.57	11,828	17,742.00	1.50
Randolph	16,488	26,380.80	1.60	15,968	21,876.16	1.37
Ripley	22,688	25,637.44	1.13	8,095	17,809.00	2.20
Rush	10,072	18,633.20	1.85	27,676	36,809.08	1.33
Scott	4,502	5,987.66	1.33	4,639	5,937.92	1.28
Shelby	11,986	14,982.50	1.25	23,465	38,951.90	1.66
Spencer	10,524	21,048.00	2	10,135	18,141.65	1.79
Starke	2,140	3,381.20	1.58	1,137	1,989.75	1.75
Steuben	12,010	21,017.50	1.75	16,040	21,493.60	1.34
St. Joseph	14,073	17,591.25	1.25	7,541	16,967.25	2.26
Sullivan	14,341	30,402.90	2.12	14,934	17,323.44	1.16
Switzerland	10,089	6,759.63	.67	5,644	10,272.08	1.82
Tippacanoe	14,004	21,566.16	1.54	15,611	27,319.25	1.75
Tipton	6,267	9,400.50	1.50	11,763	20,585.25	1.75
Union	2,123	4,033.70	1.90	10,087	16,744.42	1.66
Vanderburgh	6,580	9,343.60	1.42	8,322	10,402.50	1.25
Vermillion	6,869	10,303.50	1.50	5,096	8,918.00	1.75
Vigo	15,058	22,587.00	1.50	5,530	7,742.00	1.40
Wabash	17,822	26,733.00	1.50	18,090	25,415.10	1.39
Warren	8,720	13,952.00	1.60	6,252	9,815.64	1.57
Warrick	9,033	11,291.25	1.25	10,587	23,185.53	2.19
Washington	18,927	34,257.87	1.81	9,467	15,520.55	1.65
Wayne	12,664	17,729.60	1.40	17,945	28,712.00	1.60
Wells	17,508	28,012.80	1.60	9,347	12,431.51	1.33
White	17,849	25,345.58	1.42	5,947	9,872.02	1.66
Whitley	12,184	19,250.72	1.58	12,896	23,599.68	1.83
Total	1,175,390	1,802,579.25	1.55	1,033,407	1,695,629.63	1.55

HAY, HAY SEED, FLAXSEED AND TOBACCO.

Yield in Tons, Bushels and Pounds for 1897.

COUNTIES.	Timothy Hay, Tons, 1897.	Timothy Seed, Bushels, 1897.	Clover Hay, Tons, 1897.	Clover Seed, Bushels, 1897.	Tobacco, Cured, Pounds, 1897.	Flaxseed, Bushels, 1897.
Adams	24,240	3,032	11,601	34,798	213	160
Allen	39,649	809	19,270	21,559		
Bartholomew	11,755	1,469	9,910	16,399	1,537	207
Benton	14,956	1,284	2,194	1,592	900	
Blackford	3,740	189	1,399	1,435		
Boone	21,241	870	11,740	14,393	135	
Brown	4,895	745	1,701	2,703	3,327	264
Carroll	9,391	549	8,166	14,060	80	
Cass	10,149	594	7,412	10,205	50	96
Clark	5,739	464	3,770	4,679	18,960	6
Clay	16,528	518	5,016	4,814	420	6
Clinton	13,891	1,295	6,242	10,657	118	
Crawford	3,434	19	1,596	1,966	520	
Daviess	8,798	734	4,673	7,744	770	
Dearborn	16,992	211	4,291	4,270	22,000	10
Decatur	11,321	2,028	6,655	10,455	200	
Dekalb	21,456	981	16,433	16,257	7	74
Delaware	16,850	1,280	8,149	9,016	50	
Dubois	11,479	2,955	6,521	18,673	7,048	1
Elkhart	11,819	569	5,194	10,255		19
Fayette	6,830	693	5,314	7,374	23,900	
Floyd	3,633	48	1,700	1,640		
Fountain	11,299	1,175	8,206	9,942	150	
Franklin	7,970	546	9,528	12,615	4,427	22
Fulton	6,063	313	5,161	10,747		
Gibson	7,412	713	6,145	6,570	165	
Grant	18,998	1,450	7,893	13,274	100	58
Greene	11,590	901	5,121	4,868	6,512	135
Hamilton	15,379	2,409	7,789	11,932	491	61
Hancock	10,723	792	8,189	11,393	185	323
Harrison	5,007	169	4,221	3,869	7,700	7
Hendricks	77,811	813	9,269	11,193	50	153
Henry	11,449	790	9,320	12,011		76
Howard	11,179	401	5,354	12,454	100	
Huntington	17,434	2,207	12,862	13,732		57
Jackson	9,486	554	4,667	8,778	497	26
Jasper	14,916	2,012	342	504	50	130
Jay	17,652	1,841	12,732	11,903	1,040	10
Jefferson	8,222	605	7,235	11,840	108,547	259
Jennings	13,162	1,135	6,614	7,640	3,202	

COUNTIES.	Timothy Hay, Tons, 1897.	Timothy Seed, Bushels, 1897.	Clover Hay, Tons, 1897.	Clover Seed, Bushels, 1897.	Tobacco, Cured, Pounds, 1897.	Flaxseed, Bushels, 1897.
Johnson	10,132	2,676	6,492	9,413	2,200	8
Knox	7,102	408	7,308	8,163	5,455	124
Kosciusko	14,340	398	9,990	23,540		372
Lagrange	9,961	3,416	13,513	15,663		
Lake	32,638	1,915	912	808	1,261	375
Laporte	8,533	436	2,818	2,487		39
Lawrence	8,313	284	4,786	3,862	691	
Madison	14,612	1,423	6,248	10,147		59
Marion	26,755	121	10,131	9,242	800	
Marshall	4,200	320	3,361	15,238	440	794
Martin	5,398	541	2,273	5,361	1,200	
Miami	12,524	916	6,879	13,680		
Monroe	8,259	1,057	3,228	3,698	1,090	
Montgomery	19,977	1,455	9,166	12,785	593	53
Morgan		1,195	607	8,595		
Newton	6,828	608	643	1,190	2,460	80
Noble	14,612	359	19,667	28,518	565	
Ohio	3,688	17	1,247	1,064	111,230	
Orange	21,644	283	13,732	4,413	4,195	4
Owen	11,029	999	4,119	4,754	260	4
Parke	13,557	631	7,343	8,137		18
Perry	4,422	94	2,949	3,655	18,250	48
Pike		42		6,245		
Porter	21,699	620	3,602	3,197		
Posey	5,695	413	9,570	7,145	6,718	
Pulaski	4,519	530	797	1,291	50	
Putnam	14,900	684	7,828	10,935	1,155	
Randolph	16,597	2,916	12,916	15,310	14,377	55
Ripley	12,381	1,060	6,201	8,234	127	
Rush	11,071	1,824	7,326	13,842	7,950	82
Scott	2,592	379	4,307	11,083	325	80
Shelby	8,251	1,416	6,259	13,983	700	22
Spencer	9,779	33	8,285	14,480	125,286	
Starke	603	325	205	122	135	
Steuben	12,673	125	14,454	16,267		
St. Joseph	10,756	45	3,496	3,582	84	
Sullivan	11,680	991	5,862	3,897	291	3
Switzerland	6,721	180	4,039	3,078	162,629	114
Tippecanoe	13,406	2,086	6,334	6,938	150	
Tipton	10,399	622	2,802	4,728		75
Union	2,220	495	5,769	5,035		121
Vanderburgh	6,088	61	9,382	3,663		
Vermillion	6,020	371	3,509	2,372	10	22
Vigo	8,346	287	2,588	1,411	50	
Wabash	18,895	1,715	12,518	18,880	3,800	168
Warren	7,838	704	3,221	3,640		
Warwick	10,018	266	9,917	11,686	147,301	
Washington	10,681	1,903	4,578	6,828	3,095	1,000
Wayne	12,882	1,332	12,948	10,103	4,665	31
Wells	15,993	1,965	10,938	11,099	157	154
White	18,584	3,599	3,051	3,192	700	5
Whitley	15,495	252	10,822	13,023		94
Total	1,129,674	87,055	610,191	810,341	843,696	6,264

BROOM CORN AND FLAXSEED.

Area and Production for 1898.

COUNTIES.	Broom Corn for 1898.			Flaxseed for 1898.		
	Acres.	Tons.	Yield per Acre.	Acres.	Bush-els.	Yield per Acre.
Adams	4			27	243	9
Allen	6			20	200	10
Bartholomew	7			28	560	20
Benton	67					
Blackford				15	150	10
Boone						
Brown	50					
Carroll	3			4		
Cass				142		
Clark				11		
Clay	7	3.50	.50			
Clinton	8					
Crawford	2					
Davies				2		
Dearborn						
Decatur	5	3.75	.75	7		
Dekalb	195			3		
Delaware	1			8	64	8
Dubois	5	5	1			
Elkhart	3			35		
Fayette						
Floyd	9			5		
Fountain	1					
Franklin	22	22	1	14		
Fulton						
Gibson				11		
Grant				45		
Greene	5					
Hamilton				15		
Hancock				2	16	8
Harrison	1					
Hendricks						
Henry	1	.33	.33			
Howard	1			1		
Huntington	1			1		
Jackson	2	4	2	2		
Jasper						
Jay	15					
Jefferson	15	15	1	2	22	11
Jennings				2		

COUNTIES.	Broom Corn for 1898.			Flaxseed for 1898.		
	Acres.	Tons.	Yield per Acre.	Acres.	Tons.	Yield per Acre.
Johnson				25		
Knox	4			44		
Kosciusko	1					
LaSalle	3			1		
Lake	3					
Laporte	1			1		
Lawrence				41		
Madison	39	117	3			
Marion				6		
Marshall						
Martin	27	81	3			
Miami				1		
Monroe				3	33	11
Montgomery	13			17		
Morgan						
Newton				46		
Noble				1		
Ohio						
Orange						
Owen	1					
Parke				1		
Perry	9			3		
Pike						
Porter				1		
Posey	2					
Pulaski				75		
Putnam						
Randolph	2			20		
Ripley						
Rush	1					
Scott				1		
Shelby	7	5.25	.75	6		
Spencer	11			1		
Starke						
Stauben						
St. Joseph				1		
Sullivan	1			1		
Switzerland	14	28	2	1		
Tippecanoe	10			21		
Tipton	1	3	3	109		
Union						
Vanderburgh				3		
Vermillion	8					
Vigo	9			4		
Wabash	2			18	180	10
Warren						
Warriick	2			2		
Washington	21			6		
Wayne				239	2,151	9
Wells				2	40	20
White	20			2		
Whitley				52	520	10
Total.	646	287.83		1,156	4,179	

MILLET AND HUNGARIAN, AND TOBACCO.

Area and Production, 1898.

COUNTIES.	Millet and Hungarian.			Tobacco.		
	Acres.	Tons.	Yield per Acre.	Acres.	Pounds.	Yield per Acre.
Adams	32	160.00	5.00	12	.. . . .	.. . . .
Allen	58	145.00	2.50	.. . . .	.. . . .	.. . . .
Bartholomew	69	117.00	1.70	12	5,400	450
Benton	250	275.00	1.50	.. . . .	.. . . .	.. . . .
Blackford	99	198.00	2.00	.. . . .	.. . . .	200
Boone	144	263.52	1.83	1	.. . . .	.. . . .
Brown	195	292.50	1.50	91	.. . . .	.. . . .
Carroll	55	82.50	1.50	1	.. . . .	.. . . .
Cass	215	645.00	3.00	.. . . .	.. . . .	.. . . .
Clark	548	1,531.64	2.43	128	.. . . .	.. . . .
Clay	270	675.00	2.50	.. . . .	.. . . .	200
Clinton	151	362.40	2.40	9	1,800	200
Crawford	64	136.32	2.13	10	10,000	1,000
Davies	117	.. . . .	.. . . .	.. . . .	.. . . .	208
Dearborn	223	390.25	1.75	208	166,400	800
Decatur	71	142.00	2.00	1	.. . . .	.. . . .
Dekalb	122	366.00	3.00	1	.. . . .	.. . . .
Delaware	255	494.50	1.90	5	.. . . .	.. . . .
Dubois	26	52.00	2.00	36	30,600	850
Elkhart	553	989.87	1.79	7	.. . . .	.. . . .
Fayette	74	129.50	1.75	27	29,700	1,100
Floyd	228	452.00	2.00	.. . . .	.. . . .	.. . . .
Fountain	60	120.00	2.00	7	.. . . .	.. . . .
Franklin	202	379.76	1.88	.. . . .	.. . . .	.. . . .
Fulton	227	510.75	2.25	.. . . .	.. . . .	.. . . .
Gibson	429	643.50	1.50	6	.. . . .	.. . . .
Grant	109	308.47	2.81	.. . . .	.. . . .	.. . . .
Greene	874	1,450.84	1.66	57	23,028	404
Hamilton	160	.. . . .	.. . . .	.. . . .	.. . . .	.. . . .
Hancock	213	532.50	2.50	.. . . .	.. . . .	.. . . .
Harrison	541	1,352.50	2.50	65	45,500	700
Hendricks	93	186.00	2.00	.. . . .	.. . . .	.. . . .
Henry	268	670.00	2.50	.. . . .	.. . . .	200
Howard	11	.. . . .	.. . . .	.. . . .	.. . . .	.. . . .
Huntington	163	.. . . .	.. . . .	.. . . .	.. . . .	.. . . .
Jackson	344	860.00	2.50	5	3,825	765
Jasper	517	1,094.00	2.00	.. . . .	.. . . .	.. . . .
Jay	282	589.50	2.25	35	.. . . .	.. . . .
Jefferson	305	619.65	2.13	1,059	670,498	822
Jennings	200	400.00	2.00	18	13,500	750

COUNTIES.	Millet and Hungarian.			Tobacco.		
	Acres.	Tons.	Yield per Acre.	Acres.	Pounds.	Yield per Acre.
Johnson	104	208.00	2.00	14	14,000	1,000
Knox	960	1,920.00	2.00	55	..	..
Kosciusko	540	1,026.00	1.90	..	..	..
Lagrange	114	..	..	..	..	..
Lake	984	3,050.40	3.10	..	..	..
Laporte	577	1,229.01	2.13	17	..	..
Lawrence	543	1,086.00	2.00	19	15,200	800
Madison	749	1,924.93	2.57	2	2,000	1,000
Marion	134	335.00	2.50	26	26,000	1,000
Marshall	331	662.00	2.60	4	..	..
Martin	501	110.16	2.16	315	181,125	575
Miami	80	220.00	2.75	3	..	..
Monroe	717	1,792.50	2.50	6	4,500	750
Montgomery	59	..	..	10	..	..
Morgan . . . . .	..	..	2.70	..	..	..
Newton	11	16.50	1.50	4	..	..
Noble	48	111.84	2.33	7	..	..
Ohio	32	64.00	2.00	543	407,250	750
Orange	399	1,025.43	2.57	17	10,710	630
Owen	1,711	3,575.99	2.09	1,002	..	..
Parke	45	190.00	2.00	..	..	..
Perry	64	160.00	2.50	40	80,000	2,000
Pike . . . . .	..	..	..	27	31,050	1,150
Porter	500	1,330.00	2.66	..	..	..
Posey	197	541.75	2.75	11	6,050	550
Pulaski	627	1,254.00	2.00	46	4,600	100
Putnam	60	90.00	1.50	..	..	..
Randolph	376	752.00	2.00	269	218,428	812
Ripley	116	134.56	1.16	2	120	60
Rush	247	741.00	3.00	18	18,000	1,000
Scott	180	..	..	5	..	..
Shelby	115	230.00	2.00	28	12,350	475
Spencer	139	208.50	1.50	1,672	1,538,240	920
Starke	430	713.80	1.66	..	..	..
Steuben	43	106.75	2.25	..	..	..
St. Joseph	988	1,442.48	1.46	..	..	..
Sullivan	1,298	5,184.00	4.00	..	..	..
Switzerland	646	969.00	1.50	1,861	1,425,526	766
Tippecanoe	226	452.00	2.00	96	..	..
Tipton	99	230.67	2.33	..	..	500
Union	18	41.94	2.33	..	..	..
Vanderburgh	89	133.50	1.50	..	..	..
Vermillion	39	58.50	1.50	..	..	..
Vigo	170	382.50	2.25	50	..	..
Wabash	211	633.09	3.00	29	..	..
Warren	554	1,108.00	2.00	228	..	..
Warrick	216	432.00	2.00	1,363	1,090,400	800
Washington	339	576.00	1.70	17	9,690	570
Wayne	434	924.42	2.13	4	1,332	333
Wells	80	320.00	4.00	..	..	500
White	270	540.00	2.00	..	..	..
Whitley	87	152.25	1.75	..	..	..
Total	26,290	55,767.85	..	9,506	6,296,822	..

IRISH AND SWEET POTATOES.

Area and Yield for 1898.

COUNTIES.	Irish Potatoes, 1898.			Sweet Potatoes, 1898.		
	Acres.	Bushels.	Yield per Acre.	Acres.	Bushels.	Yield per Acre.
Adams.	513	20,520	40	..	..	..
Allen.	2,464	133,056	54	..	..	..
Bartholomew.	671	42,914	64	65	10,400	160
Benton.	640	28,160	44	84	..	..
Blackford.	231	11,550	50	14	840	60
Boone.	521	32,823	63	3	105	35
Brown.	354	15,980	45	132	3,980	30
Carroll.	641	62,177	97	..	..	..
Cass.	780	54,720	72	4	400	100
Clark.	621	30,429	49	73	5,840	80
Clay.	398	34,228	86	..	..	70
Clinton.	542	46,670	85	33	1,485	45
Crawford.	267	12,816	48	3	435	145
Davies.	283	16,414	58	10	500	50
Dearborn.	1,169	35,070	30	12	960	80
Decatur.	474	30,810	65	1	47	47
Dekalb.	1,376	143,104	104	4	..	..
Delaware.	514	30,940	60	25	875	35
Dubois.	1,297	72,632	56	22	..	..
Elkhart.	1,771	88,550	50	30	..	..
Fayette.	328	15,416	47	12	360	30
Floyd.	574	35,588	62	55	10,175	185
Fountain.	450	45,900	102	4	..	..
Franklin.	983	38,532	39	10	1,250	125
Fulton.	647	37,526	58	3	..	..
Gibson.	247	15,314	62	74	4,736	64
Grant.	347	30,536	88	4	120	30
Greene.	265	16,430	62	12	1,440	120
Hamilton.	619	59,424	96	72	9,936	138
Hancock.	353	19,768	56	27	1,890	70
Harrison.	1,007	68,476	68	19	1,520	80
Hendricks.	369	19,557	53	5	425	85
Henry.	531	35,557	67	4	320	80
Howard.	671	65,429	99	14	..	..
Huntington.	942	39,564	42	1	32	32
Jackson.	510	26,520	52	132	13,332	101
Jasper.	631	88,340	140	4	..	..
Jay.	573	27,504	48	35	..	..
Jefferson.	570	38,190	67	36	1,512	42
Jennings.	338	18,590	55	2	170	85

COUNTIES.	Irish Potatoes, 1898.			Sweet Potatoes, 1898.		
	Acres.	Bushels.	Yield per Acre.	Acres.	Bushels.	Yield per Acre.
Johnson	115	66,555	57	19	1,178	29
Knox	400	30,000	75	12	480	62
Kosciusko	1,851	151,782	82	1		35
Lagrange	1,548	154,800	100			
Lake	1,639	188,485	115			
Laporte	1,643	70,649	43	10		
Lawrence	141	9,447	67	77	8,932	116
Madison	1,104	49,680	45	54	2,538	47
Marion	1,455	75,660	52	42	560	90
Marshall	1,577	107,236	68	30	1,560	40
Martin	430	25,800	60	23	1,150	50
Miami	623	48,594	78	2	264	132
Monroe	185	9,435	51	7		50
Montgomery	536	36,448	68	47	2,350	50
Morgan	138	6,348	46			65
Newton	729	50,301	69	15	1,875	125
Noble	1,605	133,215	83	37	1,850	50
Ohio	266	12,768	48	2		
Orange	315	22,995	73	2	138	69
Owen	189	11,340	60	103		
Parke	338	31,772	94	6	630	105
Perry	370	20,350	55	3	60	20
Pike	137	6,165	45			62
Porter	1,715	104,615	61	35		
Posey	549	54,351	99	5	350	70
Pulaski	524	31,964	61	1	75	75
Putnam	425	27,200	64	34	1,700	50
Randolph	542	21,680	40	2	80	40
Ripley	905	36,200	40	1	40	40
Rush	228	10,032	44	17	1,275	75
Scott	173	6,747	39	1	75	75
Shelby	393	22,008	56	8	464	58
Spencer	2,744	188,592	68	71	8,236	116
Starke	1,010	70,700	70	3	282	94
Steuben	1,090	80,660	74			
St. Joseph	2,519	163,735	65	2		
Sullivan	123	5,781	47	6	600	100
Switzerland	744	34,224	46	1	75	75
Tippecanoe	1,251	67,554	54	64	3,520	55
Tipton	88	7,656	87	2	200	100
Union	183	12,078	66			135
Vanderburgh	972	51,516	53	19	1,615	85
Vermillion	314	21,980	70	1		
Vigo	584	40,880	70	185	20,720	112
Wabash	740	56,240	76	10	2,000	200
Warren	442	37,128	84			67
Warrick	1,225	77,175	63	161	8,424	52
Washington	183	7,320	40	3	129	43
Wayne	776	48,888	63	34	2,482	73
Wells	635	38,100	60	3	300	100
White	549	32,391	59	5	850	170
Whitley	778	77,800	100			100
Total	66,205	4,379,044		2,215	150,062	

FRUIT TREES.

Number Bearing in 1898.

COUNTIES.	Apple.	Peach.	Pear.	Plum.	Cherry.	Quince.	Grape Vines.
Adams	46,634	6,929	4,811	3,138	5,984	284	22,567
Allen	112,864	12,693	10,918	3,607	11,991	991	26,987
Bartholomew	63,230	35,592	6,121	10,267	8,626	1,488	43,480
Benton	16,159	5,593	1,508	2,276	4,684	407	14,879
Blackford	17,231	1,935	1,672	1,521	3,023	574	6,772
Boone	51,890	22,095	5,354	7,974	10,762	587	9,695
Brown	51,416	40,491	1,162	4,196	3,184	542	2,915
Carroll	41,573	14,387	3,510	4,639	8,962	664	13,536
Cass	33,767	8,868	3,780	3,371	6,939	351	15,468
Clark	74,886	262,431	5,554	7,268	4,850	2,113	98,364
Clay	72,364	31,343	4,465	7,257	7,056	1,111	18,017
Clinton	59,520	11,285	4,178	7,070	10,111	607	8,984
Crawford	93,683	39,014	3,359	13,069	5,285	1,394	27,565
Davies	49,320	27,926	2,487	6,312	8,015	1,656	13,844
Dearborn	49,104	46,594	6,386	5,243	5,905	2,968	31,969
Decatur	35,888	13,287	3,850	3,302	5,643	980	7,577
Dekalb	69,223	13,201	6,790	4,155	9,909	1,066	16,792
Delaware	50,985	14,214	7,540	8,363	10,625	873	18,444
Dubois	66,320	28,275	2,680	3,064	4,345	656	33,855
Elkhart	86,111	22,333	10,344	8,529	16,626	3,461	46,444
Fayette	22,399	18,007	3,446	2,868	4,884	1,361	3,993
Floyd	89,066	48,042	7,088	6,273	5,967	2,537	72,199
Fountain	30,543	25,814	2,844	5,323	6,679	427	5,262
Franklin	52,381	30,896	4,520	4,419	6,280	2,276	20,869
Fulton	37,529	14,186	3,892	1,602	6,312	1,019	10,125
Gibson	47,932	40,770	16,904	6,668	5,265	1,989	14,008
Grant	45,008	11,119	7,741	8,152	14,481	682	11,565
Greene	97,979	49,248	3,053	8,909	7,097	1,069	10,764
Hamilton	47,865	14,201	8,954	7,401	12,731	1,189	10,277
Hancock	33,471	14,647	6,924	6,643	8,576	1,512	10,601
Harrison	247,923	202,340	18,010	6,771	9,965	8,138	35,912
Hendricks	57,389	28,556	6,827	8,500	11,061	1,308	7,805
Henry	52,855	14,815	9,065	11,836	12,726	1,154	11,345
Howard	46,194	12,701	6,395	8,526	16,872	500	14,770
Huntington	61,670	22,347	11,083	6,670	12,106	1,782	17,476
Jackson	74,095	36,599	8,591	8,252	5,790	1,388	22,514
Jasper	23,539	13,065	1,565	1,844	4,187	208	9,235
Jay	62,986	15,184	7,039	8,879	11,558	941	16,820
Jefferson	185,609	136,613	10,662	9,074	5,767	3,404	15,399
Jennings	66,186	25,989	4,463	6,317	4,427	1,073	15,896

COUNTIES.	Apple.	Peach.	Pear.	Plum.	Cherry.	Quince.	Grape Vines.
Johnson	39,799	21,754	11,018	6,599	6,871	802	9,276
Knox	38,167	24,520	2,211	5,342	4,968	1,102	6,362
Kosciusko	85,912	29,862	18,904	5,029	11,715	819	16,837
Lagrange	54,286	17,891	5,905	2,802	8,233	901	22,892
Lake	29,416	5,041	1,129	564	4,751	108	8,026
Laporte	55,965	21,970	7,509	1,576	7,952	546	11,797
Lawrence	93,119	24,196	2,369	4,350	4,622	529	6,162
Madison	48,053	11,353	7,043	7,351	11,665	804	10,206
Marion	45,519	16,972	19,515	7,378	17,705	1,922	208,110
Marshall	50,728	16,175	4,605	1,381	5,696	517	13,482
Martin	69,005	24,816	2,297	6,047	6,341	683	6,197
Miami	40,399	11,863	4,802	3,279	7,075	879	8,496
Monroe	52,552	32,481	2,861	3,686	4,444	474	4,829
Montgomery	37,691	37,913	5,701	10,338	9,964	1,325	11,773
Morgan							
Newton	10,644	5,208	557	735	5,126	27	9,574
Noble	90,899	21,236	9,410	8,483	11,908	1,234	10,720
Ohio	10,669	8,341	1,441	753	1,349	839	2,164
Orange	80,711	41,985	4,167	5,024	6,458	1,214	5,537
Owen	70,666	47,867	3,114	6,509	5,754	622	6,906
Parke	38,858	28,439	4,244	9,290	8,541	1,090	5,854
Perry	72,194	33,744	3,297	2,804	3,171	2,771	39,246
Pike							
Porter	48,087	10,629	3,091	893	5,993	1,981	14,814
Posey	34,870	16,784	13,934	4,382	4,305	2,611	26,519
Pulaski	22,634	7,624	2,422	1,100	3,640	494	6,982
Putnam	64,714	51,750	7,200	16,283	12,620	631	9,337
Randolph	72,041	24,456	7,998	9,799	14,327	1,820	18,538
Ripley	74,321	30,621	4,031	4,471	5,999	1,482	22,982
Rush	33,786	13,514	5,422	5,481	9,156	1,157	5,014
Scott	36,326	33,942	2,611	6,500	3,749	1,530	18,495
Shelby	45,236	16,176	5,574	5,590	10,489	1,928	9,971
Spencer	53,686	28,324	3,475	6,756	6,976	2,128	29,359
Starke	15,522	5,657	788	609	2,265	28	3,630
Steuben	65,146	15,668	5,192	4,277	7,738	1,083	8,632
St. Joseph	73,260	16,261	8,323	1,894	5,767	1,134	58,942
Sullivan	58,692	34,164	3,035	8,734	6,575	1,510	11,251
Switzerland	64,712	43,568	4,101	3,582	4,118	1,936	6,429
Tippecanoe	48,041	25,326	5,166	7,222	10,869	934	24,460
Tipton	166,895	5,488	3,260	3,421	6,568	459	6,426
Union	17,355	7,010	2,861	1,894	3,616	2,297	3,002
Vanderburgh	31,678	20,568	6,361	3,772	4,578	3,351	61,900
Vermillion	17,649	15,013	2,640	3,975	4,025	560	4,677
Vigo	47,594	22,986	3,624	8,477	7,761	1,900	105,816
Wabash	52,179	18,694	7,351	5,755	11,117	891	15,873
Warren	24,732	12,741	2,241	2,574	5,420	413	7,308
Warrick	55,546	38,796	4,133	7,712	8,108	2,440	62,619
Washington	175,334	160,641	5,166	8,182	8,810	2,756	10,719
Wayne	65,998	23,448	11,705	11,484	33,663	4,044	24,897
Wells	52,363	11,005	5,662	6,165	9,656	649	14,670
White	35,376	15,006	1,403	2,160	5,273	228	7,521
Whitley	58,380	11,943	5,740	3,089	9,019	926	8,578
Total	5,250,082	2,655,263	512,019	505,302	711,005	118,868	1,849,356

NURSERY STOCK, ETC.

Value of Nursery Stock and Hothouse Plants, Rods Drain Tile, Land for Cultivation, Timber Pasture, Etc., 1898.

COUNTIES.	Value of Trees in Nursery Stock.	Value of Hothouse and Floral Products and Plants.	Rods of Drain Tile.	Acres Land Ready for Cultivation.	Acres Land in Timber, Not Pasture.	Acres Land in Pasture Grass Including Wood Pasture.
Adams	\$10	\$100	559,563	126,039	21,172	27,890
Allen	675		901,058	217,276	44,949	63,906
Bartholomew	92	741	197,734	158,671	29,783	29,227
Benton	1,010	800	896,264	186,885	1,358	29,731
Blackford			216,466	47,459	2,992	16,429
Boone	15		1,194,191	159,498	11,640	40,822
Brown	23		1,060	52,223	47,214	22,959
Carroll		50	547,862	136,450	16,302	27,531
Cass			520,397	139,066	23,562	25,809
Clark	266	863	25,263	92,240	31,966	36,697
Clay	30	216	14,677	106,071	15,890	36,126
Clinton	4,305		1,054,337	180,107	13,680	31,530
Crawford	40	10	52	91,367	36,163	53,018
Daviess	423	4	31,110	144,198	25,088	25,806
Dearborn			875	104,504	16,832	54,868
Decatur	600	300	585,431	142,906	16,760	41,294
Dekalb	19	200	557,919	128,293	52,456	30,088
Delaware	635	32	576,697	228,769	21,724	35,904
Dubois	2,345		15,216	104,545	30,985	78,168
Elkhart		3,000	206,700	154,017	21,698	27,637
Fayette	15		117,521	81,139	10,360	26,568
Floyd	40	200	10,227	37,032	15,486	17,070
Fountain	220		431,360	127,820	11,777	32,589
Franklin	134		150,967	104,292	42,908	55,974
Fulton	1		227,508	124,623	11,073	36,876
Gibson	175	22,324	108,538	137,836	24,923	12,143
Grant	2,260	344	887,965	218,938	41,389	22,350
Greene	301	194	105,117	156,796	32,808	78,465
Hamilton	455	100	768,007	156,536	31,553	83,099
Hancock	1,025		421,415	131,773	18,216	19,922
Harrison	600		14,568	133,001	46,273	54,119
Hendricks	1,731	78	508,651	137,773	5,906	58,017
Henry	2,000		565,012	165,017	25,463	29,170
Howard	207	425	657,866	294,444	18,036	18,218
Huntington	2,004	12,000	867,797	151,335	29,427	28,960
Jackson	140	4	415,481	129,595	42,912	45,138
Jasper	961	74	246,196	136,681	15,885	73,642
Jay	30	4	942,026	179,475	30,246	34,282
Jefferson		175	2,713	101,333	16,752	73,530
Jennings	275	206	48,442	114,649	27,120	70,382

COUNTIES.	Value of Trees in Nursery Stock.	Value of Hot- house and Flo- ral Products and Plants.	Rods of Drain Tile.	Acres Land Ready for Cul- tivation.	Acres Land in Timber, Not Pasture.	Acres Land in Pasture Grass, Including Wood Pasture.
Johnson	\$58	\$35	487,015	131,697	14,434	27,870
Knox	1,020	735	78,209	100,386	14,718	21,666
Kosciusko	13,175	10	466,032	191,363	33,635	54,771
Lagrange		400	84,856	144,699	21,199	36,422
Lake	7,173	150	288,033	213,082	8,184	46,649
Laporte	317		26,721	128,893	16,839	44,311
Lawrence	4,870	96	61,248	40,501	40,501	77,501
Madison	370	362	572,240	157,013	22,699	23,352
Marion	50,505	1,794	470,518	143,291	16,973	29,639
Marshall	640	6	199,477	98,945	18,760	28,220
Martin	32		24,261	100,100	26,763	53,867
Miami		275	392,854	125,451	28,874	20,096
Monroe	410	15	29,578	89,481	34,439	58,328
Montgomery	14,040	70,508	612,042	155,087	34,802	64,300
Morgan						
Newton		150	356,418	115,528	5,230	46,476
Noble		200	389,079	142,669	223,271	40,374
Ohio				17,697	15,589	12,306
Orange	100		638	106,497	125,501	49,985
Owen	419		13,997	92,483	25,351	68,660
Parke		350	145,409	126,822	35,010	67,789
Perry	50	5	83,917	83,917	59,068	52,437
Pike				69,826	9,027	48,427
Porter	6		39,644	98,492	95,197	8,790
Posey	195	6,376				
Pulaski			147,394	99,140	10,695	46,630
Putnam	1,157	225	276,518	134,800	13,105	101,043
Randolph		90	916,813	169,955	32,032	37,315
Ripley	170		28,826	152,479	36,062	42,402
Rush	1,435	60	535,078	220,347	20,722	36,639
Scott			531,577	51,547	15,618	16,336
Shelby	3		380,966	137,503	13,372	21,266
Spencer	205	265	38,093	194,580	23,346	19,121
Starke		4	23,698	45,385	10,088	39,029
Steuben			169,892	96,902	10,773	30,543
St. Joseph	30	15	207,098	169,697	83,136	35,249
Sullivan		90	40,572	167,555	67,102	39,663
Switzerland	10	133	10,792	47,316	6,834	32,606
Tippecanoe	969	750	465,439	213,952	16,862	25,626
Tipton		920	674,177	102,625	29,749	10,556
Union			200,702	65,461	9,232	36,698
Vanderburgh	15	2,000	78,200	65,686	11,156	9,131
Vermillion	4,708	80	135,041	81,346	6,171	18,655
Vigo	985	2,880	62,784	156,471	9,037	32,308
Wabash	435	800	864,810	140,906	24,429	44,794
Warren	600	20	275,243	127,690	10,665	44,167
Warrick	100	526	89,346	151,956	24,941	15,286
Washington	10	40	16,148	153,806	71,908	61,828
Wayne	2,347	6,585	337,631	148,025	17,746	49,290
Wells	125	125	822,740	117,825	29,416	24,070
White	103		328,034	165,870	17,051	52,089
Whitley	200	300	398,716	116,014	17,286	36,287
Total	\$129,947	\$140,008	28,644,191	11,712,871	2,429,854	3,506,738

SORGHUM.

Area and Product for 1898.

COUNTIES.	Sorghum Molasses.			COUNTIES.	Sorghum Molasses.		
	Acres.	Gall'ns Syrup.	Yield per Acre.		Acres.	Gall'ns Syrup.	Yield per Acre.
Adams	20	3,600	180	Madison	903	103,845	115
Allen	7	840	120	Marion	17	1,904	112
Bartholomew	102	12,852	128	Marshall	117	6,084	52
Benton	40	2,000	50	Martin	570		
Blackford	16	1,600	100	Miami	529	52,900	100
Boone	58	3,328	66	Monroe	48	4,608	96
Brown	89	6,675	75	Montgomery	65	5,720	88
Carroll	38	4,408	116	Morgan			112
Cass	5	580	116	Newton	10	500	50
Clark	71	6,390	90	Noble	20	2,900	145
Clay	3	339	113	Ohio	7	1,890	270
Clinton	30	3,180	106	Orange	172	13,932	81
Crawford	338	30,758	91	Owen	55	7,700	140
Daviess	78	11,232	144	Parke	18	1,592	144
Dearborn	37	2,775	75	Perry	383	34,470	90
Decatur	3	315	105	Pike			93
DeKalb	5	465	93	Porter	89	11,130	135
Delaware	180	18,000	100	Posey	32	3,008	94
Dubois	79	5,925	75	Pulaski	129	13,416	104
Elkhart	118	4,248	36	Putnam	148	12,580	85
Fayette	2	150	75	Randolph	159	19,875	125
Floyd	65	9,750	150	Ripley	70	5,460	78
Fountain	69	7,728	112	Rush	9	747	83
Franklin	78	4,524	58	Scott	31	2,232	72
Fulton	49	4,900	100	Shelby	47	4,042	86
Gibson	291	25,026	86	Spencer	161	14,973	93
Grant	21	2,373	113	Starke	11	902	82
Greene	62	8,370	135	Steuben	6		
Hamilton	408	48,960	120	St. Joseph	43		
Hancock	113	10,622	94	Sullivan	20	2,600	130
Harrison	74	7,770	105	Switzerland	28	2,464	88
Hendricks	35	2,800	80	Tippecanoe	676	33,800	50
Henry	20	6,400	320	Tipton	20	6,500	325
Howard	48	4,800	100	Union			
Huntington	48	1,920	40	Vanderburgh	27	2,511	93
Jackson	67	6,700	100	Vermillion	67		
Jasper	125	10,625	85	Vigo	123	15,990	130
Jay	62	9,300	150	Wabash	83	8,632	104
Jefferson	163	51,345	315	Warren	1	78	78
Jennings	83	9,213	111	Warrick	211	17,935	85
Johnson			55	Washington	50	3,600	72
Knox	68	11,900	175	Wayne	35	2,275	65
Kosciusko	46	2,898	63	Wells	42	3,654	87
Lagrange			75	White	96	11,040	115
Lake	72			Whitley	5	730	146
Laporte	49	3,773	77				
Lawrence	87	11,391	131	Total	8,851	821,467	

SMALL FRUIT.

Area for 1898.

COUNTIES.	Strawberries, Acres.	Raspberries, Acres.	Tomatoes, Acres.	Market Gardens, Acres.	Melons, Acres.
Adams.	52	2		1	8
Allen	16	59		45	
Bartholomew	1,078	857		16	94
Benton	10	20		11	11
Blackford	9	4		21	5
Boone	15	11	159	20	114
Brown	7	36	2		62
Carroll	18	20			20
Cass	34	31	23	73	53
Clark	49	91	101	134	123
Clay	17	163	108	31	33
Clinton	33	72		2	48
Crawford		21	167	10	23
Davies	6	3,311	1	23	435
Dearborn	478	521	17	45	3
Decatur	6	8		8	
Dekalb	18	37	230	28	20
Delaware	41	1,386	212	169	124
Dubois				3	3
Elkhart	204	325	37	22	1,077
Fayette	28	20	1	33	11
Floyd	306	110	47	129	57
Fountain	1,008	275	36		11
Franklin	11	14	41		41
Fulton	38	93			13
Gibson	1,010	12	1	13	1,553
Grant	38	110	33	42	106
Greene	6	5		17	66
Hamilton	38	64	235	58	2,049
Hancock	13	30	25	19	39
Harrison	280	129	2	6	49
Hendricks	16	29	147	31	24
Henry	14	352	436	24	28
Howard	16	147	672	13	58
Huntington	16	1,530	1	30	36
Jackson	16	29	302	49	514
Jasper	2	1	2	48	7
Jay	19	21	1	36	13
Jefferson	72	486	163	171	64
Jennings	12	17	1	9	1

COUNTIES.	Strawberries, Acres.	Raspberries, Acres.	Tomatoes, Acres.	Market Gardens, Acres.	Melons, Acres.
Johnson	10	10	938	6	16
Knox	20	10	127	9	1,956
Kosciusko	128	91	178	85	70
Lagrange	7	10	1	6	11
Lake	104	64	46	...	...
Laporte	77	32	5	64	31
Lawrence	4	40	1	5	113
Madison	221	2,149	73	93	43
Marion	202	207	1,220	1,220	124
Marshall	581	25	6	39	10
Martin	7	16	...	25	56
Miami	18	58	7	18	16
Monroe	6	96	...	7	14
Montgomery	14	37	86	45	99
Morgan	2	...	...	...	...
Newton	1	...	...	17	11
Noble	28	43	6	28	4
Ohio	1	22	...	3	21
Orange	2	...	49	...	...
Owen	1,003	505	...	1	93
Parke	28	36	223	...	175
Perry	231	5	1	29	26
Pike . . . . .	...	...	...	...	...
Porter	145	32	5	14	10
Posey	1	3	...	...	116
Pulaski . . . . .	...	...	...	1	4
Putnam	12	39	...	12	29
Randolph	46	48	5	55	43
Ripley	2,499	614	...	...	91
Rush	19	71	12	15	21
Scott	1	4	806	7	5
Shelby	57	9	172	22	499
Spencer	2	2	1	11	24
Starke	8	25	...	43	45
Steuben	51	26	...	13	2
St. Joseph	108	88	...	142	84
Sullivan	2	118	210	8	317
Switzerland	1	...	...	2	35
Tippecanoe	179	82	45	130	708
Tipton	1	43	287	54	689
Union	1	2	...	6	36
Vanderburgh	34	14	170	309	183
Vermillion	6	12	176	7	20
Vigo	153	914	478	706	523
Wabash	64	62	33	16	19
Warren	6	960	...	111	34
Warrick	2	33	41	5	27
Washington	64	159	79	15	21
Wayne	65	27	77	142	124
Wells	1,462	3,960	51	11	2
White	10	1,210	...	...	38
Whitley	14	4	...	...	2
Total	12,756	22,465	8,816	4,949	13,632

FRUIT AND FRUIT PRODUCTS.

Sold for Year 1897.

COUNTIES.	Apples, Bushels.	Peaches, Bushels.	Pears, Bushels.	Grape Wine Made, Gallons.	Cider Made, Barrels.	Cider Vinegar Made, Barrels.
Adams	1,860	12	2	2,417	578	91
Allen	6,170		38	967	5,341	324
Bartholomew	9,943	3,094	368	4,493	825	201
Benton	7,747	108	115	220	241	93
Blackford	162	3	2	60	104	30
Boone	4,207	10	82	45	285	158
Brown	5,145	412	59	282	672	531
Carroll	4,716	2	11	353	1,377	133
Cass	6,185	13	62	510	1,864	170
Clark	9,637	6,415	356	5,943	297	6,622
Clay	9,793	1,459	207	1,164	946	302
Clinton	2,271	10	121	546	773	206
Crawford	7,894	1,024	25	4,485	37	2
Daviess	5,763	1,934	743	1,229	127	156
Dearborn	2,297	315	392	3,064	348	25
Decatur	2,009		75	39	53	21
Dekalb	2,997	2	107	334	774	15
Delaware	8,795	34	70	408	929	261
Dubois	2,436	553	45	3,745	277	40
Elkhart	1,119	10	749	294	407	77
Fayette	717		93	68	29	18
Floyd	16,116	2,422	1,183	6,061	136	63
Fountain	2,188	22	41	164	209	76
Franklin	3,121	231	265	2,559	565	91
Fulton	2,476	5	35	86	977	167
Gibson	4,479	4,763	645	1,358	287	162
Grant	2,015	10	7	14	378	596
Greene	11,763	3,434	339	586	813	112
Hamilton	7,517		169	139	393	112
Hancock	4,151	199	171	334	409	136
Harrison	57,244	14,858	619	2,583	365	165
Hendricks	16,326	35	169	204	602	3,386
Henry	6,129		732	287	926	136
Howard	10,654	2	88	428	1,653	1,413
Huntington	5,222	86	48	911	3,154	261
Jackson	8,076	1,325	230	1,813	259	83
Jasper	2,789	11	1	12	138	12
Jay	3,115	5	141	277	948	147
Jefferson	6,362	656	714	269	341	134
Jennings	6,204	782	237	3,089	183	37

COUNTIES.	Apples, Bushels.	Peaches, Bushels.	Pears, Bushels.	Grape Wine Made, Gallons.	Cider Made, Barrels.	Cider Vinegar Made, Barrels.
Johnson	9,169	101	146	151	418	142
Knox	8,918	2,533	132	296	91	55
Kosciusko	721	7	100	182	383	49
Lagrange	253	7	14	363	223	14
Lake	1,564	3	12	73	552	55
Laporte	1,304	6	267	566	1,611	1,111
Lawrence	4,982	1,038	179	220	111	364
Madison	7,699	86	139	45	919	69
Marion	8,024	62	605	22,925	1,152	282
Marshall	1,932	92	355	1,083	186	186
Martin	2,900	787	124	175	106	306
Miami	5,945	5	174	183	1,722	247
Monroe	3,430	654	27	111	24	59
Montgomery	3,084	20	170	334	199	273
Morgan						
Newton	996	4	6	90	85	119
Noble	517	10		161	527	3
Ohio	164	1,388	48	299	33	16
Orange	5,474	981	60	286	31	92
Owen	6,188				607	100
Parke	8,142	15	60	291	991	148
Perry	11,844	892	712	7,016	3,606	1,722
Pike						
Porter	828	18	19	140	261	99
Posey	5,888	2,255	1,128	8,280	763	143
Pulaski	1,699	49	20	5	605	58
Putnam	17,206	164	753	143	1,377	1,113
Randolph	12,578	10	50	198	2,086	676
Ripley	7,630	335	27	3,454	500	59
Rush	1,376	20	51	46	166	22
Scott	2,095	307	31	208	54	77
Shelby	4,156	187	83	962	362	356
Spencer	2,886	1,943	163	12,247	433	189
Starke	345	24	24	101	71	9
Steuken	432	29			38	5
St. Joseph	980	11	157	1,360	310	31
Sullivan	13,123	3,257	271	900	375	137
Switzerland	1,708	94	10	563	43	4
Tippecanoe	5,627	78	647	925	1,243	982
Tipton	128,581	315	83	142	625	115
Union	378	9	93		1	
Vanderburgh	6,429	7,333	1,189	18,568	466	429
Vermillion	3,391			146	54	16
Vigo	17,575	2,896	629	5,204	3,106	3,091
Wabash	3,014	99	45	105	1,224	160
Warren	3,404	36	41	26	152	37
Warrick	1,973	2,555	220	4,203	211	686
Washington	8,202	2,109	106	117	286	38
Wayne	3,863	138	279	342	418	48
Wells	1,799		190	869	1,403	305
White	6,135	967	6	248	1,559	206
Whitley	492		12		338	11
Total	637,740	77,998	18,967	140,403	59,974	31,278

HONEY, MAPLE SYRUP AND SUGAR.

Honey for 1897, and Maple Syrup and Sugar Products for 1898.

COUNTIES.	Honey and Beeswax, Lbs., 1897.	Maple Syrup, Gals., 1898.	Maple Sugar, Lbs., 1898.	COUNTIES.	Honey and Beeswax, Lbs., 1897.	Maple Syrup, Gals., 1898.	Maple Sugar, Lbs., 1898.
Adams	9,940	55	45	Madison	6,407	2,446	122
Allen	6,432	595	50	Marion	5,837	1,897	13
Bartholomew	3,787	834	32	Marshall	1,260	669	323
Benton	2,408	..	..	Martin	556	409	283
Blackford	95	8	..	Miami	13,363	1,187	2
Boone	4,297	1,757	211	Monroe	359	4,207	616
Brown	75	211	89	Montgomery	7,717	6,186	258
Carroll	1,762	3,752	250	Morgan . . . . .	..	..	..
Cass	2,971	1,348	2	Newton	11,090	..	..
Clark	6,104	566	2	Noble	2,942	1,305	67
Clay	2,252	393	16	Ohio . . . . .	..	..	..
Clinton	1,757	1,852	225	Orange	5,590	1,211	104
Crawford	35	41	..	Owen	2,565	2,894	420
Davies	6,745	3,405	127	Parke	3,790	2,514	20
Dearborn	1,250	837	50	Perry	925	6	178
Decatur	368	460	20	Pike . . . . .	..	..	..
Dekalb	2,607	3,624	968	Porter	6,990	423	441
Delaware	3,055	260	16	Posey	3,132	..	..
Dubois	448	118	..	Pulaski	4,649	..	..
Elkhart	3,845	2,184	70	Putnam	7,747	7,948	336
Fayette	11,076	2,027	400	Randolph	18,137	1,515	17
Floyd	245	44	..	Ripley	1,768	158	4
Fountain	820	2,512	149	Rush	1,263	2,492	10
Franklin	8,925	1,119	6	Scott	625	8	..
Fulton	3,377	3,442	24	Shelby	700	757	82
Gibson	1,560	620	1	Spencer	7,504	..	2
Grant	7,783	683	54	Starke	2,015	..	..
Greene	4,186	636	401	Steuben	1,630	2,032	1,044
Hamilton	4,127	3,643	493	St. Joseph	7,304	690	102
Hancock	7,040	274	28	Sullivan	11,168	2,011	1,295
Harrison	3,139	289	3	Switzerland	14,770	133	3,005
Hendricks	7,034	921	..	Tippecanoe	9,630	1,176	370
Henry	3,988	2,753	23	Tipton	1,358	..	21
Howard	4,826	890	74	Union	1,780	680	..
Huntington	6,548	2,316	387	Vanderburgh	3,230	..	..
Jackson	3,168	707	172	Vermillion	2,720	548	..
Jasper	1,585	..	..	Vigo	1,346	1,434	175
Jay	8,091	155	11	Wabash	9,181	1,318	22
Jefferson	15,908	302	56	Warren	836	16	7
Jennings	1,972	202	15	Warrick	3,425	90	105
Johnson	1,424	749	20	Washington	9,293	628	1,200
Knox	4,837	521	326	Wayne	4,351	2,797	81
Kosciusko	8,860	1,530	624	Wells	18,335	38	..
Lagrange	1,966	1,176	729	White	810	..	4
Lake	3,941	..	..	Whitley	11,842	1,250	170
Laporte	3,410	620	..	Total	420,663	110,159	36,704
Lawrence	897	6,659	18,949				

SUGAR BEETS.

Experimental Area of Sugar Beets Grown in 1898.

COUNTIES.	Sugar Beets, Acres.	COUNTIES.	Sugar Beets, Acres.
Adams	9	Madison	47
Allen	27	Marion	12
Bartholomew	140	Marshall	5
Benton		Martin	5
Blackford		Miami	
Boone		Monroe	1
Brown		Montgomery	1
Carroll		Morgan	3
Cass	3	Newton	6
Clark	1	Noble	
Clay		Ohio	
Clinton	3	Orange	
Crawford		Owen	1
Daviess		Parke	
Dearborn		Perry	
Decatur	1	Pike	
DeKalb	3	Porter	
Delaware	8	Posey	50
Dubois		Pulaski	2
Elkhart	1	Putnam	1
Fayette		Randolph	11
Floyd	4	Ripley	1
Fountain		Rush	
Franklin		Scott	
Fulton	8	Shelby	11
Gibson		Spencer	
Grant		Starke	3
Greene	2	Steuben	2
Hamilton	2	St. Joseph	17
Hancock	6	Sullivan	
Harrison	207	Switzerland	416
Hendricks		Tippecanoe	19
Henry	4	Tipton	7
Howard	123	Union	
Huntington	7	Vanderburgh	
Jackson	1	Vermillion	
Jasper		Vigo	
Jay	8	Wabash	3
Jefferson	1	Warren	
Jennings	1	Warrick	1
Johnson		Washington	
Knox	13	Wayne	21
Kosciusko	7	Wells	3
Lagrange		White	1
Lake		Whitley	
Laporte	1		
Lawrence		Total	1,286

HORSES AND MULES.

Horses and Mules for 1898, and Died During Year.

COUNTIES.	Horses.		Mules.	
	On Hand May 1, 1898.	Died During Year.	On Hand May 1, 1898.	Died During Year.
Adams	7,137	166	42	1
Allen	12,365	273	93	
Bartholomew	7,706	295	9,502	1,372
Benton	7,725	333	385	38
Blackford	3,654	80	109	5
Boone	11,621	249	289	5
Brown	2,791	75	442	3
Carroll	7,614	151	172	7
Cass	7,842	174	462	14
Clark	5,340	118	861	21
Clay	6,520	253	886	39
Clinton	8,995	211	165	4
Crawford	2,936	90	355	14
Daviess	7,512	192	1,319	395
Dearborn	3,660	283	398	15
Decatur	6,440	179	930	69
Dekalb	6,556	149	64	12
Delaware	8,281	222	179	208
Dubois	4,575	129	973	11
Elkhart	8,188	207	65	3
Fayette	3,863	76	140	4
Floyd	2,093	89	195	8
Fountain	6,525	219	410	21
Franklin	5,852	155	340	7
Fulton	6,144	161	94	5
Gibson	7,406	249	1,755	58
Grant	8,973	231	288	3
Greene	7,902	234	1,152	20
Hamilton	8,382	390	321	5
Hancock	6,901	233	191	5
Harrison	7,147	244	552	13
Hendricks	8,249	250	579	36
Henry	8,944	249	153	4
Howard	8,194	260	161	8
Huntington	7,958	186	131	9
Jackson	4,715	154	1,964	32
Jasper	6,633	383	288	20
Jay	7,677	242	118	6
Jefferson	6,630	180	691	34
Jennings	4,837	153	698	7

COUNTIES.	Horses.		Mules.	
	On Hand May 1, 1898.	Died During Year.	On Hand May 1, 1898.	Died During Year.
Johnson	7,968	197	715	55
Knorr	7,100	224	1,903	111
Kosciusko	9,449	228	141	4
Lagrange	6,421	108	48	1
Lake	6,635	231	92	1
Laporte	8,704	312	102	1
Lawrence	4,408	150	1,046	14
Madison	9,422	277	226	15
Marion	16,283	542	731	22
Marshall	7,870	181	63	10
Martin	6,250	144	678	21
Miami	6,853	232	105	6
Monroe	4,218	222	501	58
Montgomery	10,452	311	521	25
Morgan	7,469	197	716	23
Newton	5,656	218	399	3
Noble	8,374	723	161	15
Ohio	1,019	15	202	8
Orange	5,089	163	908	4
Owen	4,899	156	549	62
Parke	7,083	231	650	14
Perry	4,007	142	857	27
Pike	5,240	189	1,168	23
Porter	6,543	211	79	
Posey	5,685	245	2,584	172
Pulaski	5,644	213	139	5
Putnam	8,827	233	780	13
Randolph	9,243	241	268	9
Ripley	5,624	120	648	9
Rush	8,392	241	216	6
Scott	2,683	124	350	8
Shelby	8,676	275	350	6
Spencer	6,293	273	1,842	47
Starke	3,036	183	85	10
Steuben	5,107	87	61	1
St. Joseph	9,482	271	114	2
Sullivan	9,469	276	689	34
Switzerland	3,286	107	434	63
Tippecanoe	12,052	336	427	17
Tipton	4,783	175	218	6
Union	3,009	73	141	3
Vanderburgh	5,441	315	2,657	103
Vermillion	4,749	171	298	3
Vigo	9,502	291	916	44
Wabash	8,923	273	147	1
Warren	7,456	199	392	11
Warrick	9,266	303	2,189	522
Washington	7,010	179	1,330	51
Wayne	7,930	996	193	151
Wells	7,939	179	116	3
White	9,142	382	477	11
Whitley	5,239	107	96	2
Total	630,543	20,524	58,630	4,977

HORSE GRAPHIC.

Showing by Counties the Largest Horse Producers.

[See Marginal Explanation]



MILK COWS, CATTLE AND HOGS.

Milk Cows and Other Cattle, Hogs and Losses, 1898.

COUNTIES.	Milk Cows on Hand.	All Other Cattle on Hand.	Cattle of All Kinds Died Past Year.	Hogs Over Three Mos. Old on Hand.	Hogs Died During Year.	Pigs Under Three Mos. Old on Hand.
Adams	5,829	6,734	302	21,792	10,484	18,878
Allen	10,519	9,895	304	30,734	7,369	22,066
Bartholomew	7,455	5,714	723	21,434	7,862	12,750
Benton	3,343	8,988	327	15,775	2,598	10,796
Blackford	2,697	2,362	233	10,566	4,405	8,727
Boone	7,906	10,583	393	44,717	2,408	41,275
Brown	1,500	2,134	323	5,574	1,647	4,468
Carroll	6,465	6,314	449	29,870	3,254	23,509
Cass	5,934	6,542	356	24,009	5,284	18,967
Clarke	4,176	3,890	250	10,390	932	6,745
Clay	5,059	5,940	1,318	15,373	2,868	11,029
Clinton	6,584	8,683	323	38,288	4,877	32,618
Crawford	2,186	1,820	87	5,593	314	1,719
Daviess	5,480	6,197	675	27,905	5,244	12,263
Dearborn	4,531	2,581	201	5,946	599	3,867
Decatur	4,442	7,857	183	25,461	4,749	18,472
Dekalb	5,515	5,108	400	17,052	1,287	16,318
Delaware	6,531	8,244	830	39,297	4,901	32,196
Dubois	4,205	4,707	306	14,243	4,782	7,767
Elkhart	8,279	6,353	474	17,174	1,607	14,444
Fayette	2,574	3,782	128	13,968	4,590	13,100
Floyd	2,448	911	87	2,812	297	1,221
Fountain	4,708	7,196	581	22,745	4,459	20,162
Franklin	4,963	5,413	369	14,184	7,087	10,172
Fulton	4,628	4,914	293	18,033	4,938	16,182
Gibson	4,773	6,158	1,029	22,087	6,503	13,472
Grant	7,594	7,689	1,197	32,374	6,107	29,007
Greene	5,265	7,455	544	28,072	2,911	10,969
Hamilton	7,084	9,334	509	35,830	5,046	36,720
Hancock	5,303	7,045	1,391	28,954	8,195	23,882
Harrison	6,622	3,660	475	14,209	1,954	6,217
Hendricks	6,236	12,227	1,192	35,596	8,496	28,697
Henry	5,930	7,473	723	34,727	6,973	32,619
Howard	5,958	5,524	474	33,912	6,116	28,084
Huntington	6,255	7,646	527	28,454	5,486	18,945
Jackson	4,401	5,859	698	16,725	6,258	10,585
Jasper	4,618	11,941	376	15,332	1,321	11,028
Jay	7,013	6,230	512	23,898	4,748	23,497
Jefferson	5,836	4,522	572	12,251	981	6,597
Jennings	4,038	4,257	203	11,688	1,576	7,823

COUNTIES.	Milk Cowson Hand.	All Other Cattle on Hand.	Cattle of All Kinds Died Past Year.	Hogs Over Three Mos. Old on Hand.	Hogs Died During Year.	Pigs Under Three Mos. Old on Hand.
Johnson	5,579	14,451	311	38,797	6,448	21,634
Knox	6,219	7,608	1,545	27,310	4,338	18,330
Kosciusko	7,187	9,813	273	31,361	3,840	25,475
Lagrange	4,827	5,299	186	17,490	1,932	15,278
Lake	9,387	10,247	465	8,792	1,961	5,672
Laporte	8,176	6,621	487	13,613	3,604	12,365
Lawrence	3,925	7,011	422	9,628	2,636	6,036
Madison	7,226	9,636	1,728	33,465	5,811	28,677
Marion	8,724	4,973	279	20,201	2,791	15,174
Marshall	7,150	6,579	359	19,854	6,097	17,342
Martin	3,581	8,555	363	8,715	2,724	4,490
Miami	5,388	9,073	482	23,139	4,704	18,949
Monroe	3,687	5,414	323	13,014	2,131	6,547
Montgomery	7,299	11,601	386	48,500	10,506	41,956
Morgan	4,797	7,614	97	26,405	5,607	19,785
Newton	3,353	6,355	97	14,680	547	7,359
Noble	6,498	7,544	159	21,918	2,921	18,482
Ohio	1,105	737	126	2,317	147	1,859
Orange	4,720	4,446	186	12,364	2,857	6,064
Owen	3,909	6,535	517	12,977	3,239	7,682
Parke	5,218	7,698	584	25,482	4,253	18,455
Perry	2,947	2,396	234	7,817	870	3,071
Pike	2,894	4,310	3,908	16,621	3,337	10,205
Porter	8,637	6,128	398	11,948	1,733	9,335
Posey	3,444	3,902	486	12,838	5,933	9,684
Pulaski	5,918	5,650	469	19,613	2,803	10,124
Putnam	5,908	12,508	390	33,946	6,600	25,364
Randolph	6,448	8,274	913	33,563	12,234	29,790
Ripley	6,364	5,268	435	13,041	4,664	10,377
Rush	4,610	9,326	649	44,330	8,076	35,376
Scott	1,721	1,889	218	14,109	511	3,061
Shelby	5,393	6,153	512	27,515	5,519	21,001
Spencer	3,574	3,656	392	13,152	2,365	6,338
Starke	2,971	2,554	194	4,253	884	3,438
Steuben	3,914	7,353	228	15,068	856	14,188
St. Joseph	7,857	4,572	407	12,337	1,813	7,966
Sullivan	6,164	7,576	1,404	29,523	4,500	16,047
Switzerland	2,381	2,088	165	6,417	444	3,762
Tippecanoe	8,982	8,563	455	28,905	4,286	25,772
Tipton	3,756	5,483	370	24,862	5,928	20,360
Union	2,346	3,640	125	13,335	6,142	14,190
Vanderburgh	4,448	1,730	262	5,839	1,181	3,721
Vermillion	2,997	4,060	326	13,610	2,927	8,774
Vigo	5,140	8,968	748	15,351	3,389	10,316
Wabash	6,526	8,187	953	24,899	7,797	22,321
Warren	3,910	6,530	1,163	18,408	3,252	16,021
Warrick	4,272	4,161	301	15,513	2,813	8,842
Washington	5,611	5,947	173	19,586	1,534	12,239
Wayne	12,261	7,490	949	28,768	6,795	23,896
Wells	5,180	5,734	769	28,972	8,143	25,970
White	5,905	10,619	671	23,908	2,777	17,312
Whitley	4,465	5,395	152	16,252	2,145	13,622
Total	489,762	587,832	48,334	1,887,384	372,868	1,429,487

Showing by Counties the Largest Cattle Producers.

Map of Indiana showing population density by county in 1900. The map is shaded to represent population density, with a legend indicating four categories: 100,000 and over (solid black), 25,000 to 100,000 (dark gray), 10,000 to 25,000 (medium gray), and less than 10,000 (white). The map shows the following counties and their approximate population density categories:

- 100,000 and over:** Indianapolis (Marion County).
- 25,000 to 100,000:** Evansville (Vanderburgh County), Ellettsville (Fayette County), Terre Haute (Vigo County), Fort Wayne (Allen County), Gary (Lake County), Hammond (LaPorte County), South Bend (Benton County), Elkhart (Elkhart County), and several others.
- 10,000 to 25,000:** Most of the surrounding counties, including those in the northern and western parts of the state.
- Less than 10,000:** Many of the rural counties, particularly in the southern and eastern parts of the state.

Major geographical features shown include Lake Michigan to the north and the Ohio River to the south and east.

SWINE GRAPHIC.

Showing by Counties the Largest Swine Producers.

[See Marginal Explanation.]



HOG CHOLERA GRAPHIC.

Showing by Counties the Greatest Fatalities in Year Ending May, 1898.

[See Marginal Explanation.]



SHEEP, LAMBS AND WOOL.

Sheep, Lambs, Wool and Slaughtered Animals.

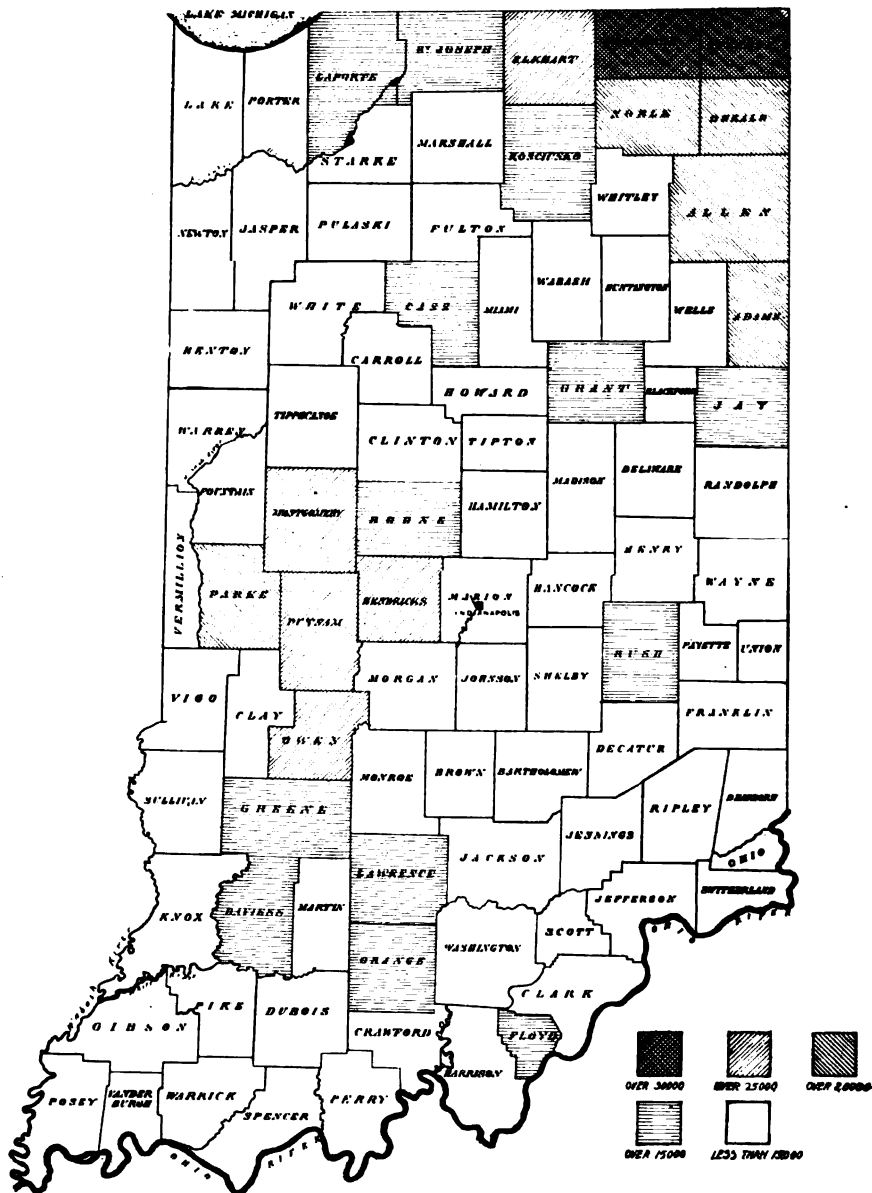
COUNTIES.	Sheep on Hand May 1, 1896.	Lambs on Hand May 1, 1896.	Pounds Wool Clipped, 1897.	Pounds Wool-clip, Estimate, 1898.	Sheep Killed by Dogs Past Year.	Sheep Died Past Year.	Value of all Animals Slaughtered on Farm.
Adams.	12,152	11,459	53,032	63,916	219	541	\$55,176
Allen.	18,668	10,894	91,514	96,557	289	787	260,977
Bartholomew.	4,024	2,552	23,210	28,363	481	315	52,510
Benton.	2,202	875	10,222	8,594	45	93	14,450
Blackford.	6,225	3,035	27,397	30,735	310	256	16,634
Boone.	10,245	6,991	42,603	57,114	210	499	49,181
Brown.	4,108	3,839	15,410	19,111	239	311	23,079
Carroll.	8,668	6,606	35,197	46,994	302	814	67,779
Cass.	15,010	9,663	70,113	79,515	249	713	30,567
Clark.	2,782	2,333	9,879	9,606	103	102	26,180
Clay.	4,027	6,926	15,799	14,931	356	204	61,487
Clinton.	8,683	5,474	36,876	46,716	139	521	52,879
Crawford.	2,887	2,401	13,711	13,382	86	101	26,819
Daviess.	6,008	3,661	27,124	27,835	173	457	50,387
Dearborn.	2,520	2,220	12,350	14,053	118	86	59,283
Decatur.	6,033	4,491	46,606	28,631	825	238	34,504
DeKalb.	16,726	9,730	178,113	96,428	160	706	69,316
Delaware.	14,253	8,198	76,745	82,265	382	704	47,377
Dubois.	2,845	2,243	13,567	12,505	135	189	39,369
Ekhart.	16,239	9,079	64,295	76,123	399	739	76,663
Fayette.	4,325	2,694	20,574	26,075	68	291	23,029
Floyd.	585	301	1,715	1,674	31	27	18,829
Fountain.	13,076	8,819	64,846	70,921	1,045	396	46,561
Franklin.	6,416	5,062	21,427	33,537	38	344	37,533
Fulton.	13,733	13,312	63,426	72,678	223	1,132	45,043
Gibson.	3,367	2,890	19,005	21,845	114	602	36,452
Grant.	16,156	8,838	84,034	86,638	212	539	40,089
Greene.	11,982	5,547	54,028	59,852	254	511	65,351
Hamilton.	7,008	3,964	33,560	34,916	231	336	45,514
Hancock.	6,707	3,752	27,621	32,380	123	594	36,629
Harrison.	2,990	1,990	13,667	14,038	163	299	63,945
Hendricks.	9,826	6,617	40,784	54,585	451	781	52,833
Henry.	7,308	5,278	39,212	39,726	751	532	49,197
Howard.	5,359	3,577	22,067	29,579	479	363	39,911
Huntington.	11,518	7,413	62,607	61,979	139	773	80,788
Jackson.	3,487	2,562	17,862	16,852	169	201	25,292
Jasper.	2,649	1,310	10,525	13,295	6	119	35,600
Jay.	14,570	9,382	73,812	85,840	96	719	78,815
Jefferson.	5,003	4,186	23,718	30,339	198	267	37,781
Jennings.	5,039	3,260	21,411	23,917	58	205	18,040

COUNTIES.	Sheep on Hand May 1, 1898.	Lambs on Hand May 1, 1898.	Pounds Wool Clipped, 1897.	Pounds Wool-clip, Estimate, 1898.	Sheep Killed by Dogs Past Year.	Sheep Died Past Year.	Value of all Animals Slaughtered on Farm.
Johnson	6,347	4,784	27,327	32,105	280	438	\$40,348
Knox	3,950	2,221	19,408	18,332	137	229	37,590
Kosciusko	26,044	18,947	119,553	144,545	241	1,276	88,777
Lagrange	28,100	13,519	168,672	165,614	141	1,708	46,796
Lake	1,883	866	12,908	12,861	7	70	27,016
Laporte	9,402	5,031	47,808	54,391	397	594	34,287
Lawrence	4,505	2,790	20,031	21,150	310	205	32,325
Madison	6,147	3,714	32,690	23,738	360	434	38,994
Marion	3,463	2,333	18,028	18,404	190	201	67,388
Marshall	15,845	12,469	56,507	66,770	994	954	35,148
Martin	8,235	5,441	40,160	35,944	250	511	27,987
Miami	7,345	4,838	36,473	41,342	267	437	97,827
Monroe	9,239	10,612	36,719	42,160	694	730	23,682
Montgomery	24,618	12,714	102,123	116,673	436	1,430	61,840
Morgan	7,020	5,000	19,454	14,540	159	394	.....
Newton	946	477	4,483	4,830	11	51	11,988
Noble	28,505	24,649	188,736	166,427	139	1,324	33,661
Ohio	2,188	1,829	12,607	10,378	83	85	5,137
Orange	7,352	5,637	30,182	33,076	324	394	52,146
Owen	14,078	6,508	61,283	69,384	284	603	36,701
Parke	13,454	7,590	78,116	84,328	251	2,232	39,658
Perry	1,919	1,557	7,553	6,407	72	206	28,107
Pike	3,810	3,096	5,783	16,109	165	201	.....
Porter	4,174	2,039	27,710	27,323	99	118	37,431
Posey	760	1,602	10,039	12,201	70	3,148	62,080
Pulaski	5,558	4,373	30,162	35,592	222	311	46,076
Putnam	11,317	7,106	42,170	52,360	427	624	57,398
Randolph	7,823	5,184	30,720	43,651	116	487	97,088
Ripley	4,228	3,383	19,579	20,315	54	189	36,364
Rush	6,810	4,029	8,803	31,037	109	519	42,481
Scott	1,239	789	4,862	4,947	77	35	11,541
Shelby	3,480	2,132	18,611	19,381	132	231	47,961
Spercer	3,781	1,528	9,251	9,318	197	150	53,744
Starke	1,413	738	8,032	8,014	11	130	16,202
Steuben	28,704	13,899	140,973	153,550	144	1,025	32,547
St. Joseph	9,186	4,372	50,091	53,092	367	923	186,867
Sullivan	9,398	5,887	44,854	44,633	364	1,330	25,854
Switzerland	4,146	3,277	17,501	20,466	132	156	35,090
Tipecanoe	8,248	4,179	30,853	122,566	258	1,147	49,647
Tipton	4,605	16,866	23,966	23,434	242	321	21,412
Union	3,224	1,870	16,606	21,818	76	236	34,291
Vanderburgh	571	480	2,145	3,049	13	36	49,995
Vermillion	2,030	3,095	15,062	13,022	281	123	25,182
Vigo	2,197	1,423	10,276	12,544	104	111	176,273
Wabash	15,995	12,189	71,934	98,161	807	740	47,430
Warren	7,045	3,331	33,472	43,597	96	577	17,799
Warriek	3,325	2,636	17,640	17,677	126	248	71,018
Washington	9,613	8,217	42,064	42,889	163	5,175	69,784
Wayne	9,269	3,365	25,847	32,431	307	342	60,196
Wells	12,657	8,183	57,449	71,106	251	532	54,737
White	4,102	2,831	25,594	25,291	100	190	66,217
Whitley	16,402	8,932	69,814	96,582	118	668	32,561
Total	747,878	507,861	3,582,812	4,030,294	21,164	52,583	\$1,581,081

SHEEP-GROWING GRAPHIC.

Showing by Counties the Greatest Number.

[See Marginal Explanation.]



MILK, BUTTER, CHEESE, EGGS AND POULTRY.

Milk, Butter, Cheese, Poultry and Eggs Product for 1898.

COUNTIES.	Gallons Milk Consumed and Sold from Farm.	Pounds Butter Consumed and Sold from Farm.	Pounds Cheese Consumed and Sold from Farm.	Dozens Poultry Consumed and Sold from Farm.	Dozens Eggs Consumed and Sold from Farm.
Adams.	1,899,361	301,831	83,822	10,138	678,187
Allen.	3,017,965	638,769	8,571	13,932	545,741
Bartholomew.	1,272,176	390,687	1,773	19,329	473,182
Benton.	728,574	202,632		7,428	80,808
Blackford.	415,230	89,650	17	2,679	115,776
Boone.	2,055,967	527,466	1,743	28,150	682,781
Brown.	612,856	148,228	115	9,882	153,967
Carroll.	1,361,784	373,556	132	2,622	373,681
Cass.	1,339,552	294,293	152	10,786	611,899
Clark.	1,153,317	315,766	306	7,104	251,858
Clay.	1,231,867	361,817	963	13,335	322,614
Clinton.	2,170,447	412,104	13	25,304	502,202
Crawford.	556,574	167,695		4,354	248,287
Daviess.	1,439,260	597,688	2,104	19,081	329,425
Dearborn.	1,411,664	415,783	403	6,227	414,266
Decatur.	1,118,783	325,536	745	17,095	360,137
DeKalb.	2,509,639	554,661	1,144	15,660	547,260
Delaware.	2,599,790	506,139	114	14,611	640,908
Dubois.	457,260	122,329	10,285	4,052	475,752
Elkhart.	2,047,411	677,443	504	19,529	378,967
Fayette.	849,779	208,670	230	7,326	239,725
Floyd.	778,347	206,949	202	5,114	104,786
Fountain.	954,521	223,687	295	18,158	257,342
Franklin.	1,538,374	377,098	305	10,976	611,560
Fulton.	1,143,419	216,339	308	9,876	383,706
Gibson.	1,091,855	273,416	156	12,647	218,851
Grant.	1,939,724	505,229	226	17,779	600,938
Greene.	1,291,157	338,623	692	16,152	550,813
Hamilton.	2,483,516	607,468	4,147	27,137	642,145
Hancock.	1,481,263	381,104	625	15,000	509,182
Harrison.	1,189,475	460,240	14,726	11,577	625,998
Hendricks.	1,642,494	452,738	453	20,151	464,798
Henry.	1,768,889	404,089	459	18,384	500,290
Howard.	1,641,679	349,157	250	16,372	439,324
Huntington.	1,818,809	392,769	48	13,615	517,361
Jackson.	1,002,912	259,539	1,992	8,938	391,996
Jasper.	989,104	204,680	6,326	9,300	189,843
Jay.	1,502,390	443,667		1,502	701,611
Jefferson.	1,458,149	361,851	5,300	7,639	436,564
Jennings.	936,966	269,548	1,671	7,447	463,092

COUNTIES.	Gallons Milk Consumed and Sold from Farm.	Pounds Butter Consumed and Sold from Farm.	Pounds Cheese Consumed and Sold from Farm.	Dozens Poultry Consumed and Sold from Farm.	Dozens Eggs Consumed and Sold from Farm.
Johnson	1,578,690	370,595	540	21,193	290,235
Knox	899,240	193,338	2,101	29,898	261,812
Kosciusko	2,261,932	653,770	500	15,779	845,829
Lagrange	1,993,208	555,828	6	8,906	467,009
Lake	3,871,466	343,204	53,261	7,088	356,013
Laporte	2,251,734	586,216	20	6,694	181,240
Lawrence	840,558	180,053	140	7,556	265,767
Madison	1,809,731	501,594	807	18,220	524,106
Marion	3,310,508	577,859	251	20,607	412,738
Marshall	1,114,086	274,929	1,799	6,278	333,011
Martin	600,827	164,319	996	8,831	262,846
Miami	1,612,821	378,835	38,584	9,756	431,447
Monroe	919,455	237,499	1,589	9,436	195,517
Montgomery	2,447,962	437,496	417	19,964	418,139
Morgan					
Newton	493,274	102,280		3,730	127,492
Noble	1,690,790	482,243		13,678	510,358
Ohio	306,020	89,030	700	2,007	98,390
Orange	830,088	229,438		27,590	338,360
Owen	885,302	215,900	1,106	11,473	299,478
Parke	1,066,819	314,672	1,325	36,487	324,298
Perry	607,817	173,529	830	13,273	206,733
Pike					
Porter	3,031,096	264,242	75	6,250	159,713
Posey	789,230	215,543	1,296	17,124	229,060
Pulaski	1,330,530	432,978	19	9,791	306,876
Putnam	1,559,310	301,144	1,616	21,609	453,356
Randolph	1,946,338	4,770,128	147	796,912	677,229
Ripley	1,648,027	373,712	9,773	8,432	671,130
Rush	1,210,029	330,387	143	25,179	386,676
Scott	983,893	138,518	47	6,342	184,166
Shelby	2,747,087	409,128	929	17,237	502,030
Spencer	741,677	261,276	195	8,381	458,612
Starke	609,950	117,884		3,667	149,687
Steuben	1,426,750	373,140		6,855	518,996
St. Joseph	3,024,035	544,836	752	11,017	401,843
Sullivan	1,165,319	273,615	674	15,765	456,881
Switzerland	559,325	199,478	2,514	13,437	283,709
Tippecanoe	1,480,907	322,406	5,556	17,960	317,218
Tipton	902,721	226,610	260	8,660	378,315
Union	740,413	269,024		6,027	182,875
Vanderburgh	176,278	309,304	768	8,516	200,321
Vermillion	660,426	208,009	558	11,146	175,916
Vigo	2,096,831	296,061	587	13,829	180,164
Wabash	1,997,253	539,206	610	16,992	193,963
Warren	698,773	189,735	26	9,698	212,601
Warrick	1,126,681	387,457	1,184	11,260	398,147
Washington	1,683,627	409,947	755	15,222	617,615
Wayne	2,320,295	627,209	92,932	18,274	368,680
Wells	2,031,588	1,028,209	1,235	23,990	776,232
White	1,091,090	204,278	156	13,619	584,530
Whitley	1,298,714	392,289		7,249	389,143
Total	129,406,908	35,953,710	1,279,349	1,965,181	34,992,097

PRODUCTION FROM CEREALS, ETC., OF THE STATE.

Quality and Value of Raw Productions of the Farm, and the Manufactures Therefrom in the State, for the Year Ending March 1898.

ARTICLES.	Raw Products.		Value.
	Bushels.	Pounds.	
Wheat	12,936,068		\$11,901,182
Corn	15,564,586		4,085,704
Barley	461,411		144,612
Oats	422,910		87,269
Rye	285,396		132,928
Buckwheat	56,091		27,545
Flaxseed	300		354
Hops		400,529	61,081
Apples	144,839		35,186
Malt	377,727		207,750
Tobacco		272,787	122,754
Total	30,261,323	673,316	\$16,823,388

ARTICLES.	Manufactured Products.				Value.
	Barrels.	Pounds.	Gallons.	Numbers.	
Flour	3,951,538				\$18,769,805
Bran		7,332,397			45,827
Midlings		1,665,925			16,659
Meal		68,299,457			512,246
Screenings		236,181			1,653
Chop feed		77,096,463			693,868
Hominy		85,365,383			768,288
Grits		13,749,080			123,741
Rye, flour and corn meal, mixed	1,745,920				7,856,640
Corn flakes		52,830,199			41,735,857
Buckwheat flour		1,103,043			23,439
Starch		31,990,044			511,841
By-products of corn		29,599,991			136,042
Cider vinegar	10,000				60,000
Whisky			31,681,922		63,363,344
Apple brandy			16,274		32,548
Lager beer	1,013,470				6,080,820
Ale	163,363				1,306,904
Porter	162,019				1,134,133
Cigars				7,521,856	263,371
Total	7,046,310	369,268,163	31,698,196	7,521,856	\$143,437,526

NOTE.—A considerable number of mills, etc., of whom the inquiry was made had not kept accounts, and therefore the result is only approximate.

LUMBER PRODUCTION.

*The Kinds of Wood, Number of Feet and Value of Lumber
Produced from Timber of the State for the Year Ending
April, 1898.*

KINDS OF WOOD.	Number of Feet.	Mill Value.
White Oak	116,563,399	\$1,748,451
Burr Oak	2,506,000	50,120
Black Oak	1,578,000	15,780
Water Oak	1,430,000	14,300
Red Oak	3,985,099	59,776
Pin Oak	180,000	2,700
Ash	16,478,615	329,572
Beech	22,215,664	222,157
Elm	20,932,681	261,659
Poplar	26,939,964	538,799
Hickory	15,217,702	304,354
Walnut	8,702,891	261,087
Cherry	1,352,500	40,575
Sugar Maple	3,746,459	37,465
Gum	9,626,744	110,708
Soft Maple	9,796,689	117,560
Sycamore	5,568,858	111,377
Basswood	4,677,523	56,130
Cottonwood	1,402,723	14,027
Tamarack and Hackberry	154,050	1,849
Butternut	78,429	2,353
Chestnut	229,000	4,580
Buckeye	40,000	400
Mulberry	500	7
Sassafras and Persimmon	2,500	50
Catalpa	600	9
Appletree	10,200	510
Birchwood	100,000	1,000
Total	273,516,690	\$4,907,355

NOTE.—As many of the saw-mill owners had not kept an account of the lumber sawed, nor of the amount of the various kinds, it was impossible to obtain full reports on this inquiry; and, therefore, the amount of lumber produced is only approximate, though the ratio of one kind to another is believed to be about correct.

THIRD ANNUAL REPORT
OF THE
Farmers' Mutual Insurance Companies' Union
OF INDIANA,

HELD AT
Indianapolis, January 5, 1899.

ORGANIZATION, CONSTITUTION AND BY-LAWS.

OFFICERS:

AARON JONES, President, South Bend.
C. C. MAYS, Vice-President, Franklin.
JOSHUA STRANGE, Secretary, Arcana.
J. L. THOMAS, Treasurer, Pendleton.

MEMBERSHIP.

Allen County Farmers' Mutual.
Benton, White and Jasper Counties Farmers' Mutual.
Delaware County Farmers' Mutual.
Clinton and Tippecanoe Counties Farmers' Mutual.
Decatur County Farmers' Mutual.
Delaware, Henry and Randolph Counties German Baptist.
Elkhart County Farmers' Mutual.
Fulton, White and Pulaski Counties Farmers' Mutual.
Grant County Farmers' Mutual.
Henry County Farmers' Mutual.
Hamilton County Farmers' Mutual.
Hendricks County Farmers' Mutual.
Gibson, Warrick and Vanderburg Counties Farmers' Mutual.
Jefferson County Farmers' Mutual.
Howard (Kokomo) County Farmers' Mutual.
Lawrence County Farmers' Mutual.
Madison County Farmers' Mutual.
Lawrence Tp., Marion County, Farmers' Mutual.
St. Joseph County Farmers' Mutual.
Tipton County Farmers' Mutual.
Wayne, Union and Fayette Counties Farmers' Mutual.
Warrick, Vanderburgh and Gibson Counties Farmers' Mutual.
Whitley County Farmers' Mutual.

CONSTITUTION AND BY-LAWS.

Article 1. This Association shall be known as the Farmers' Mutual Insurance Companies' Union of Indiana.

Art. 2. The membership of this Association shall be composed of the various Farmers' Mutual Fire Insurance Companies organized in the State of Indiana, who, by their Directors, shall voluntarily unite with this Association, and pay to the Treasurer the membership fee of three dollars and annual dues of two dollars.

Art. 3. The voting members shall be the delegates sent by the various companies. Each company shall be entitled to one delegate and one additional delegate for each \$1,000,000 or fraction over \$500,000 of insurance in force on that company's books. Any member of a Farmers' Mutual Fire Insurance Company may take part in the annual meetings, but is not entitled to vote unless a duly authorized delegate.

Art. 4. The officers of this Association shall be a President, Vice-President, Secretary and Treasurer, who shall hold their offices for one year, and until their successors are elected and qualified.

Art. 5. The fee for membership in this Association shall be \$3 and the annual dues shall be \$2.

Art. 6. The objects of this Association shall be to gather information relative to mutual insurance, to promote the interests of mutual insurance companies by formulating the best forms of applications, policies and adjustment blanks for the settlement of losses, best form of book-keeping and best method of collecting assessments, and by mutual comparison of news and experiences advance the interests of insurance; to issue annually circular letters, to lessen the number of fires by advising precautionary measures, and thus lessen the cost of insurance.

Art. 7. The annual meetings shall be held at the Agricultural Rooms in the State House on Thursday following the first Monday in January of each year, commencing at 10 o'clock a. m.

Art. 8. This constitution can be extended or amended at any regular meeting of this company by a two-thirds vote of the members present, provided a written notice of such intention shall have been given at a previous annual meeting.

BY-LAWS.

Section 1. The officers of this Association shall be elected at the annual meeting by ballot, a majority of all the ballots cast being necessary for an election.

Sec. 2. The officers of this Association shall perform the work required of them by the annual meeting at such compensation as shall be allowed by the annual meeting.

PRESIDENT'S ANNUAL ADDRESS.

To the Delegates and Members of the Farmers' Mutual Insurance Companies of Indiana:

Gentlemen—Another year has come and gone since we met in annual session. The principles of mutual insurance are more deeply planted in the minds of the people than ever before. Each year but adds to the proof of the lesser cost of mutual insurance as compared with insurance on the stock plan. Not only is the cost in premiums less, but the principles of mutual insurance makes the number of fires less, and hence saves much valuable property to the State and world. The principle therefore should be encouraged not only by all farmers, but by all good citizens who have the best interests of the State and country at heart.

The wealth of the world is increased and promoted by mutual insurance, and the property thus saved accumulates to help pay the taxes of township, county and State, and therefore is to the advantage of every tax-payer in the State. The province of our Mutual Farmers' Insurance Companies' Union is to promote mutual insurance by all legitimate means.

We therefore recognize, first, if we can point out the cheapest and best methods of conducting mutual insurance that all the companies in the State could each be benefited thereby, it would be ample reason for maintaining the State Union of Mutual Insurance Companies.

Second, if we could point out some of the most frequent causes of fires and make suggestions how they can be avoided or lessened, it would be of great advantage to the companies and to the people of the State.

Third, by standing solidly together we are in position to prevent any unfriendly legislation, should any be attempted. And as all the stock companies are practically united into an insurance combination, it becomes absolutely necessary that the mutual insurance companies of the State should have a State organization.

For the reasons stated, and other reasons that might be cited, the State Union should be maintained; and it is to be hoped that every Farmers' Mutual Insurance Company will become a member before the close of another year.

The younger or weaker the company the more need it has of receiving the benefits the Union can give it. Mutual insurance companies are organized for the purpose of saving money to the policy holders, and not, as in the case of the stock companies, to make money for the stockholders and managers. (There are no stockholders in mutual companies). The difference of purpose of organization therefore makes more or less antagonism of the two plans of insurance. Stock companies get all they can out of policy holders. And mutual companies save them all they can. Therefore every farmer in the State should patronize the mutual plan of insurance by insuring his property in some Farmers' Mutual doing business in his county.

The future success and perpetuity of mutual insurance rests on good management of all the companies. Therefore this Union should by every means in its power aid and strengthen the weaker companies in the State and urge them to so transact their business to gain and retain the confidence of the farmers and business men. Good and honest management therefore is essential to success and permanency. Every mutual company in the State should be careful not to over-insure property, and where farmers are so careless as not to have good and safe chimneys, refuse to insure their property until they provide their dwellings with good and safe chimneys and keep their stoves and pipes good and well protected.

Every company in the State should insist that all the modern appliances for safety should be in place and in good order when using a steam engine about barns or buildings. Also in using tank heaters, and in the use of matches and where they are kept, and smoking should absolutely be prohibited about barns or on the farm in dry times.

We have with us the Hon. W. D. Forbes, President of the National Association of Co-operative Mutual Insurance Companies, who will take pleasure in addressing the meeting should it be the pleasure of the members to hear him. He is a man of wide and varied experience in insurance matters, and can impart to us valuable information. Thanking you for the courtesies rendered during the past year, and trusting your deliberations may be agreeable and profitable.

AARON JONES.

ADDRESS OF W. D. FORBES.

Mr. Forbes was introduced and spoke as follows:

Mr. President and Gentlemen—It affords me very great pleasure to meet with you at this, your annual convention, and become acquainted with the farmers of your beautiful State, who are engaged in this most laudable work of co-operative or mutual insurance.

We have heard through your worthy fellow-citizen, Mr. Willey, of the work being done in the interest of the people of the State of Indiana, and we expect to hear at this and subsequent meetings of greater progress in this work from the efforts of your people.

The question of insurance has become a business proposition, and it makes no difference of whatsoever kind, the fact remains that whenever we have property liable to be destroyed by fire or the elements over which we have no control, we need protection, and to secure this protection there must be a tax levied, so to speak, to provide for such protection.

Underlying this proposition is the principle upon which the great government of the United States was founded, namely, a just and equitable taxation.

Now, as to the method of providing for this taxation we wish to call your attention. It is a proposition also that insurance is bought and sold,

and while this is a fact, the price or tariff for such protection has been altogether too high in protecting foreign trade on this line, and for this reason we are in favor of throwing off the tariff heretofore claimed and collecting only a nominal duty that will be quite sufficient to meet all just demands and requirements of such protection.

In the interests of these propositions you have called this State meeting, which is of great importance in advancing your interests upon this line, and in making due preparations for every emergency that may arise in the future, that may calculate to thwart your progress, and it is only fair to presume that these contingencies will arise in your State as they have in others.

It is well to be prepared to meet them when they do come, and this can only be done by a thorough organization of your local companies or associations into a State association of this kind.

There remains no longer a question of doubt as to the safety, cheapness or possibilities of co-operative insurance. These questions have all been satisfactorily settled by its promoters, as the history of co-operative insurance in the several States would show, and when we hear the reports of your various county and district companies of this State, and those of the various other States, telling of the millions of dollars saved annually through co-operative insurance, we must conclude that such insurance is written upon a correct and equitable plan, and that the taxation of its members, to secure safe protection, is reduced to a minimum, or at actual cost.

Of the reliability of co-operative insurance there can be no doubt, as any co-operative association, properly managed, can not fail to meet its just losses, and has not to our knowledge ever failed to do so.

The possibilities of co-operative or mutual insurance are available and applicable to all kinds and classes of insurance, such as life, fire, wind-storm, hail, casualty or accident. These are all as successfully protected by the co-operative plan, by State as well as by local organizations. We make these statements from our knowledge of and connection with associations writing insurance in all these lines, and I am glad to report that it is being successfully done in the State of Iowa and other States where they have laws permitting such kinds of insurance to be written on the co-operative plan.

Now, as to the work of our State conventions of mutual insurance companies, such questions pertaining to the best plans and methods of conducting your ordinary business; time and manner of making assessments; the vigilance of your officers and agents as to protection against questionable or fraudulent losses; the manner of adjusting losses and paying the same; these and many other important questions will be discussed at your annual meetings.

It will also be the work of this organization to look into and make provisions for proper laws that will govern, regulate and guarantee to you

your rights to write insurance of all kinds and classes upon the co-operative plan as is granted to other lines of insurance companies, and only through the work of this convention can you reach your legislators effectively. We would recommend that you make provisions, if it has not already been done, for legislative work, by appointing a committee on mutual insurance, whose duty it shall be to look after the framing of such laws as will guarantee to you these privileges.

It may perhaps seem to you a waste of time to speak of the great advantages of co-operative insurance that is becoming so popular in many States, in fact in all where its principles and benefits are known and acknowledged by the people. I would like to speak to you of the work in Indiana, Illinois, Iowa, Minnesota, Nebraska, Missouri, Kansas, Wisconsin, Michigan, Ohio, New York, Massachusetts, Pennsylvania, the Dakotas, and in fact of all States from which we hear such good reports, but a somewhat detailed statement from one of these States will perhaps be sufficient to give you something of an idea of the vast amount of money saved annually, and the very low rates for which all kinds of insurance can be carried, and something of a correct idea can be formed of the enormous tax the American people have been paying for the privilege of permitting others to do for them that which they are fully competent to do for themselves.

In the State of Iowa we have one hundred and forty county mutual fire insurance companies, with an assessable capital of one hundred and sixty millions of dollars, writing exclusively farm property. These companies pay their losses at an average of \$1.80 per thousand annually.

We have ten or twelve State companies, writing wind-storm, hail, fire, life and accident insurance upon the co-operative plan, without noting the fraternal organizations.

The Iowa Tornado Mutual, writing exclusively wind-storm insurance, has an assessable capital of fifty-six millions of dollars, with forty-eight thousand members. This association has paid in losses to its members in the fifteen years of its history one hundred and twenty-five thousand dollars, with an average annual assessment of twenty-five cents per thousand dollars.

The Farmers' Mutual Hail Insurance Association of Iowa has paid in losses to its members in the six years of its history seven hundred and twenty thousand dollars, with an average annual assessment of \$1.85 per hundred. The Town Dwelling Mutual, writing exclusively fire insurance, has paid to its members in losses in the six years of its history \$11,500.00, at an average annual assessment of sixteen and two-thirds cents per thousand dollars. The Mercantile and Union Mutual, writing exclusively fire insurance in cities and towns, have paid all of their losses at almost sixty per cent. of the board rates.

The life and accident companies are doing an equally successful business at about one-half the rates of the premium companies.

The Mutual Tornado, Fire and Hail Associations of the State have an assessable capital of two hundred and twenty-five millions of dollars, and at a low estimate we have a saving of at least two millions of dollars annually, from mutual or co-operative insurance, and if the entire insurance of the State was written upon the mutual plan it would be many times this amount, and to say the least, that through co-operation we are saving many millions of dollars annually, and it only rests with the people of our country that millions more may be saved.

In the further consideration of this proposition I wish to call your attention to the national organization of mutual insurance companies, organized some three years ago. This, like our local organizations, needs your hearty support, and the benefit that we may expect to derive is commensurate with the interest in which it is supported by the various States. I need not tell you of the necessity of your State Association of Mutual Insurance Companies. I think you are in position to know and feel the importance of such an organization, and that its interests will increase as your local organizations increase, and the advantages and benefits become more potent.

If it is an advantage for you to meet in delegate convention to hear reports from your several local companies, how much more so will it further the interests of co-operative insurance to meet in convention of States and learn of the success and manner of work, etc., of other States, and so keep pace with the latest and most approved methods pertaining to this work.

There is no doubt but there will be needed some special legislation of a national character in the interest of co-operative insurance, and it will be rather a slow progress for a single State, through its State organization, to get such legislation without the aid of the States interested. In fact, we doubt if anything could be accomplished without an urgent appeal to Congress, through some such an organization of States, of a national character.

The same good reason offered for the organization of a State convention of mutual insurance companies must and will apply to the National Association of Mutual Insurance Companies.

Trusting that your State will be fully represented at our national meeting in Chicago in February, I wish you great prosperity in this commendable work.

I thank you for your kind attention and for the opportunity of meeting with you at your State meeting.

PROCEEDINGS.

January 5, 1899.—10 a. m.

The Farmers' Mutual Insurance Union of Indiana convened in Room 11, in State House, President Aaron Jones presiding. A Committee on Credentials was appointed, consisting of J. L. Thomas, D. P. Monroe and H. Henderson, and reported as follows on delegates present:

Madison County Insurance Company—J. Sanders, Anderson, and C. C. Mays, Frankton.

Gibson, Warrick and Vanderburgh Counties Insurance Company—J. T. Monroe, Buckskin, and G. H. Stunkel, Haubstadt.

Jefferson County Insurance Company—D. P. Monroe, Levi.

Lawrence, Monroe and Jackson Counties—Hiram Henderson, Heltonville.

Wayne, Union and Fayette Counties—D. O. Dilling, Hagerstown.

Hamilton County Insurance Company—W. C. Bray, Noblesville; G. M. Young, Noblesville, and Wm. Hussey, Zionsville.

Delaware, Henry and Randolph Counties Insurance Company—L. J. Hook, Stockport, and W. Profinger, Union City.

Delaware County Insurance Company—Enoch Drumm, Muncie.

Henry County Insurance Company—J. O. Mendenhall, New Castle.

Lawrence Township of Marion County Insurance Company—J. W. Apple, of Oaklandon.

Grant County Insurance Company—I. M. Miller.

Kokomo Insurance Company—L. E. Collier, Kokomo.

Whitley County Insurance Company—I. N. Dunfee, Barber.

St. Joseph County Insurance Company—Aaron Jones.

Allen County Insurance Company—G. B. Lawrence, Abolt.

Benton, White and Pulaski Counties Insurance Company—H. A. Wiley, Kewanna.

Decatur County P. of H. Insurance Company—C. I. Ainsworth, Greensburg.

Mr. J. L. Thomas asked how organizations were formed.

Mr. Forbes: Just as State organizations are made. We take \$100,000 before it is effective. We lost in storms \$100,000. We wrote in one year 2,500 members for \$1,500,000. The average loss to the 160 acres in hail storms is \$80.00 per year.

A vote of thanks was extended to Mr. Forbes, of Iowa, for the valuable information upon the various kinds of mutual and co-operative insurance.

The following amendment to the Constitution was adopted, to wit: That the annual dues shall be \$2 instead of \$1, as Article 5 provides. Article 5, as amended, reads as follows:

"The fee for membership in this association shall be \$3, and the annual dues shall be \$2."

The Secretary was instructed to publish, in pamphlet form, "size" for No. 6 envelope, the report of this meeting.

The following were appointed as a Legislative Committee: George V. Kell, Hunterstown; C. C. Mays, Frankton; J. C. Mendenhall, New Castle; Joseph Saunders, Anderson; J. W. Dunfee, Barber; George B. Lawrence, Abolt; Aaron Jones, South Bend.

Kell and Lawrence, being members of the Legislature, were called and addressed the Association upon the successful management of mutual insurance, cause of fires, etc.

SECRETARY'S REPORT.

The Secretary and Treasurer made their annual reports, as follows:
Membership Fees and Dues Paid—

	<i>Dues.</i>	<i>Fees.</i>
Wayne, Union and Fayette counties	\$2 00	
Jefferson County, balance	1 00	
Hamilton County	2 00	
Gibson, Warrick and Vanderburgh counties.....	2 00	
Delaware County		\$3 00
Lawrence, Monroe and Jackson counties.....	2 00	
Delaware, Henry and Randolph counties.....	2 00	
St. Joseph County	2 00	
Henry County	2 00	
Madison County	2 00	
Grant County	2 00	
Whitley County		3 00
Kokomo (Howard County)	2 00	
Lawrence Township (Marion County).....		3 00
Lawrence Township (Marion County).....	2 00	
Fulton, White and Pulaski counties	2 00	
Allen County	2 00	
Decatur County	2 00	
Total	\$29 00	\$9 00
Amount collected	\$38 00	
Balance on hand	23 35	
Total on hand	\$61 35	

Expense Account—

Printing 2,500 copies of the report of the annual meeting.....	\$47 00
Rebate to Lawrence Township for overpaid dues.....	1 00
Postage	98

Total expense\$48 98

Leaving a balance on hand, Jan. 6, 1899, of \$12.37.

J. L. THOMAS, Treasurer.

JOSHUA STRANGE, Secretary.

The following officers were elected for the ensuing year: Aaron Jones, President, South Bend; W. C. Bray, Vice-President, Noblesville; Joshua Strange, Secretary, Arcana; J. L. Thomas, Treasurer, Pendleton.

Mr. Forbes, President of the National Association, gave an invitation to the State Union to send delegates to the National Association that meets in Chicago, February 28 to March 3, 1899. He very much impressed the Association as to the advantages to be gained by the meeting of the State and local companies in a national association.

Mr. C. M. Walters gave an interesting talk, for the farmers to look well to their interests, or they may have their privileges already secured taken from them by Congress, were old line and foreign companies to get legislation to knock them out.

President Jones then said he had not expected to say anything about his going to Washington as one of the National Committee to look after the interests of the people, but I am on my way now, and don't expect to return until we accomplish something, and don't forget it.

A motion prevailed that Joshua Strange, Secretary, and L. E. Collier be selected as delegates to attend the National Association of Mutual Insurance Companies to meet in Chicago, February 28 to March 3, 1899.

The President notified all companies that desired the forms of blanks to be prepared by him could obtain them by so notifying him, as their company would have them printed for themselves.

REPORTS.

The following companies made brief reports, as follows:

WARRICK, VANDERBURGH AND GIBSON COUNTIES.

December 3, 1898.

Annual report of the Secretary and Treasurer of the Farmers' Mutual Aid Association of Warrick, Vanderburgh and Gibson counties for the year ending December 3, 1898:

Number of policies issued, including 7 transfers, during the year	33
Number of policies canceled during the year.....	25
Number of policies in force at end of the year.....	815

Total value of property insured.....	\$1,315,000
Number of assessments levied during the year.....	2
Total of assessments per hundred dollars.....	28c
Number of losses during the year.....	15
Balance on hand December 4, 1897.....	\$325 38
Delinquencies collected from 1897.....	141 85
Appraisement fees collected during year.....	31 14
Withdrawal fees collected during year.....	8 78
Total of June and October assessments.....	3,420 83
Running expenses for year.....	448 34
Losses paid.....	3,462 16
Balance on hand, not including delinquencies.....	17 48

Officers elected for ensuing year: President, W. K. Norcross, Elberfeld; Secretary, Alwin L. Heim, Chandler; Treasurer, Fred Kampe, Elberfeld. Directors: A. J. Lowrance, Chandler; John H. Smith, Elberfeld; William Hillyard, Earl; James Wallis, Oakdam; William R. McClary, Mackey; Wm. Thompson, Oakland City.

ALWIN L. HEIM, Secretary.

ELKHART COUNTY.

Farmers' Mutual Aid Association of Elkhart County, Indiana, for the year ending December 31, 1898:

Receipts—Amount Collected by Directors—

Q. D. Winegar, York Township.....	\$174 52
H. H. Nusbaum, Middlebury Township.....	273 04
I. I. Berkey, Clinton Township.....	458 64
J. F. Stillwell, Benton Township.....	389 86
D. D. Rodibaugh, Jackson Township.....	456 20
Leonard McConaughy, Elkhart Township.....	351 28
Andrew Zigler, Jefferson Township.....	247 15
O. A. Reed, Washington Township.....	125 53
Nat VanNamee, Osolo Township.....	101 12
Moses Van Scoik, Concord Township.....	202 70
Jacob Domer, Harrison Township.....	534 08
Louis Stouder, Union Township.....	442 79
Clark Truex, Locke Township.....	239 48
M. E. Hochstetler, Olive Township.....	184 37
Harrison Miller, Baugo Township.....	181 21
Solomon Thornton, Cleveland Township.....	43 08
Wm. J. McConnell, Perry Township, Noble County.....	536 33
Harvey Hull, Sparta Township, Noble County.....	363 03
I. S. Grady, Turkey Creek Township, Kosciusko County.....	426 52
J. W. Whitehead, Van Buren Township, Kosciusko County...	238 60

George Bechtel, St. Joseph County.....	356 12
C. N. Price, Marshall County	164 36
B. F. Zimmerman, Lagrange County	12 85
The amount of the uncollected from 1897.....	94 74

Total receipts	\$6,597 60
Balance on hand January 1, 1898.....	2,004 57

Services as Director—

Q. D. Winegar	\$11 72
Henry H. Nusbaum	15 65
I. L. Berkey	25 98
J. F. Stillwell	20 99
D. D. Rodibaugh	24 31
Leonard McConaughy	19 06
Andrew Zigler	15 68
O. A. Reed	9 52
Nat VanNamee	6 48
Moses Van Scoik	13 05
Jacob Domer	32 92
Lewis Stouder	25 13
Clark Truex	18 47
M. E. Hochstetler	10 71
Harrison Miller	10 55
Solomon Thornton	3 65
Wm. J. McConnell	32 81
Harvey Hull	26 41
I. S. Grady	27 32
J. W. Whitehead	21 43
Geo. Bechtel	19 31
C. N. Price	11 21
B. F. Zimmerman	2 25
Percentage on collections of uncollected of 1897.....	2 85

Total	\$402 41
Total amount of receipts	\$6,597 60
Total losses and expenses	6,705 19
Balance on hand	1,896 98
Uncollected	47 32

Number of policies in force, 3,429.

Number of policies gained during 1898, 59.

Aggregate amount of policies, \$4,556,060.00.

Aggregate amount of policies gained during 1898, \$128,160.00.

Year's assessment, 15 cents on the \$100.

This company has been organized for twenty-eight years, has paid losses and expenses to the amount of \$159,671.07, with an average assessment of twenty-one cents and two and three-sevenths mills on the one hundred dollars per year.

This is a true and correct statement, to the best of my belief.

S. A. HOOVER, Secretary, Goshen.

D. J. WHITEHEAD, President, New Paris.

WHITLEY COUNTY.

Farmers' Mutual Fire Insurance Association of Whitley County, Indiana.

Organized in 1884; commenced business September 10, 1884.

Number of assessments made in 14 years, 23.

Cost per year on each \$100, 18 5-7 cents.

Amount of policies in force November 14, 1898, \$2,023,490.

Number of members, about 1,600.

L. W. DUNFEE,

Secretary, Treasurer and Delegate, Baber.

GRANT COUNTY.

Grant County Farmers' Mutual Insurance Company's annual report of August 30, 1898:

Amount of insurance	\$205,897
Amount taken during year	58,407
Amount taken since August 30 to February 4, 1899, 87 policies, aggregating	73,925
Deducting expirations to February 4, 1899, leaves total in force..	252,132
Loss since September 2, 1897	5

ROBERT L. SMITH, Secretary, Michaels.

I. M. MILLER, President and Delegate, Upland.

LAWRENCE, JACKSON AND MONROE COUNTIES

Farmers' Co-operative Insurance Association of Lawrence, Jackson and Monroe counties has been organized ten years, and now has about 1,200 members.

Amount of insurance	\$1,000,000
Loss for the year	2,200

We make one assessment at the close of each year to cover losses and expenses. We give thirty days to pay assessments, and any member being delinquent meets with a loss, while delinquent, gets nothing from the company but pity.

HIRAM HENDERSON, Secretary, Hentonville.

R. WRAY, President, Zelma.

CLINTON AND TIPPECANOE COUNTIES.

Twenty-ninth annual report of the Secretary of Farmers' Mutual Insurance Company of Clinton and Tippecanoe Counties for the year ending September 30, 1898:

Property insured this year	\$640.941
Property insured to date	2,511,009
Policies issued this year, 552.	
Policies now in force, 1,692.	
Losses by fire this year, 13.	
Losses by lightning, 16.	
Losses paid this year	\$7,186 07
Amount paid since organization	36,672 58
Treasurer had on hand per last report	443 95
Secretary collected advance premium and policy fees.....	2,530 88
Orr & Burkhalter assessment	1,787 23
Johnson & Maish assessment	3,151 06
Borrowed money	950 00

Total to be accounted for by Treasurer	\$8,863 12
--	------------

He has paid out as per vouchers shown:

Mary Orr, barn and contents burned, August 30, 1897.....	\$600 00
D. P. Burkhalter, contents of same barn	732 92
H. C. Johnson, two barns and contents burned, October 9, 1897.	1,222 01
D. W. Maish, barn and contents burned, November 10, 1897....	1,400 00
L. D. Waldron, hogs killed by lightning, November 14, 1897....	14 00
Harris W. Tinkle, 5 tons timothy hay burned, November 20, 1897	20 00
G. H. Miller, office stove.....	7 00
Wilson Humphreys & Co., 1,000 policies, 1,250 applications, two records—500 each	35 00
A. C. Metzger, two cords split hickory wood	3 00
W. N. Clark, printing 2,300 postals, 2,000 annual reports, 1,000 No. 10 envelopes, 1,000 No. 6.....	9 00
Creamery ditch assessment	6 00
D. A. Thompson, damage to house and contents, fire, January 29, 1898	15 80
Eph. Rothenberger, damage to summer kitchen and contents, fire, January 2, 1898	5 22
Cornelius Lahrmon, house and partial contents.....	394 64
A. P. Martin, outhouses and contents, February 16, 1898, fire..	100 00
A. F. Ward, damage to barn, lightning.....	12 00
Lydia E. Martz, house by fire, April 3, 1898.....	100 00
Nancy J. Polk, damage barn and contents, lightning, May 19....	102 50
A. Clingenpeel, collecting and sending assessment.....	2 40

M. W. Howard, damage to house and contents, fire.....	7 37
E. E. Baker, steer killed by lightning, May 21, 1898.....	43 00
G. M. Clark, horse killed by lightning, June 8, 1898.....	85 00
Stephén Clark, barn damaged, lightning, June 8, 1898.....	6 00
J. M. Wilson, appraising property	1 00
E. M. Jacoby, appraising property	50
H. H. Wigle, mare killed by lightning, May 14, 1898.....	55 00
S. V. Titus, expenses, delegate to Union, Indianapolis.....	3 50
T. C. Curtis, helping adjust Polk loss	1 50
W. A. Burns, adjusting David Black loss	1 00
J. A. Flannigan, 12 steers killed by lightning, June 8, 1898....	450 00
David Black, cow killed by lightning, June 7, 1898.....	47 00
J. W. Moore, cow killed by lightning, June 25, 1898.....	38 00
D. F. Gish, barn and contents, lightning, July 15, 1898.....	250 00
S. C. Ticen, ewe lamb, lightning, July 3, 1898.....	4 40
Sarah L. Leader, barn and contents, lightning, July 28.....	1,050 00
James R. Titus, buck sheep, lightning, June 7, 1898.....	12 00
Brand and other interest on borrowed money.....	56 19
Charles Sheets, steer killed, lightning, September 5, 1898.....	16 00
J. C. Whitehead, cow, lightning, August 20, 1898.....	46 00
E. E. Peter, stable, buggy shed contents, fire, September 22...	175 00
S. E. Titus, barn, fire, September 27.....	550 00
S. B. Smith, dinners during year.....	6 80
Eisenhart, horse feeds during year.....	3 95
Tax on lot and office fixtures.....	1 32
Harvey Resey, services, director	13 17
G. M. Clark, services, director.....	109 95
J. J. Caldwell, services, director.....	82 00
F. H. Yundt, services, director.....	57 45
Calvin Dill, President, and taking applications.....	13 67
F. M. Gable, Treasurer, and taking applications.....	93 05
F. M. Gable, incidental expenses.....	29 46
Milt. K. Reiff, adjusting Sheets's loss	1 50
D. F. Clark, Secretary	454 50
D. F. Clark, paid out, stamps, postal cards, envelopes, etc.....	134 41
<hr/>	
Total disbursements	\$8,681 18
This deducted from the yearly income leaves in Treasurer's hands	181 94
That deducted borrowed money	950 00
<hr/>	
Makes our indebtedness	\$768 06
<hr/>	
The Secretary's office has this year earned.....	\$2,530 88

Office wages for the year aggregate	823 79
Agents' commissions	367 79
	<hr/>
	\$1,191 58
	<hr/>
Amount left to pay losses	\$1,339 30

Our average cost for 29 years has been, per hundred, 16 2-3.

D. F. CLARK, Secretary, Mulberry, Ind.

CALVIN DILL, President, Lafayette, Ind.

HAMILTON COUNTY.

The Farmers' Insurance Association of Hamilton County, Ind., reports that the Association has a membership, January, 1899, of 1,636; policies, 1,872; amount insured, \$2,127,497, divided by townships as follows:

	<i>Members.</i>	<i>Policies.</i>	<i>Amount.</i>
Noblesville	176	197	\$209,378
Wayne	124	141	174,955
Fall Creek	120	143	144,855
Delaware	91	99	112,275
Clay	105	119	153,165
Washington	344	389	402,680
Adams	253	282	315,180
Jackson	249	293	334,952
White River	174	209	280,057

This shows an increase during the year of 67 members and \$90,165 in risks.

Twenty losses have occurred during the year, amounting to \$2,587.39.

Total paid out and on hand.....	\$4,023 55
Receipts for the Year—	
On hand last report	\$24 10
Collected First National Bank of Noblesville	1,583 10
Collected Bank of Westfield	848 40
Collected State Bank of Sheridan	645 01
Collected Farmers' and Merchants' Bank of Cicero.....	281 77
Collected Citizens' Bank of Arcadia.....	641 17
	<hr/>
Total receipts	\$4,023 55

There has been one assessment the past year of 20 cents on each \$100, which makes the average cost of insurance 26 6-14 cents on each \$100 per annum for the last fourteen years.

GEO. W. YOUNG, President, Noblesville,
WM. HUSSEY, Secretary, Zionsville,
W. C. BRAY, Actuary, Noblesville,
LEWIS S. KERCHEVAL, Sheridan,
WILLIAM HUSSEY, Zionsville,

Directors.

FARMERS' INSURANCE COMPANY OF KOKOMO.

The total cost per \$1,000 for the five years for fire, lightning and tornado insurance has been \$9.05. For fire alone, \$7.05, or an annual average cost of \$1.81 on each \$1,000 for fire, lightning and tornado, or \$1.41 on each \$1,000 for fire and lightning alone.

Following is a statement of the business for the past year:

Number of fire policies in force December 1, 1897.....	419
Number of fire policies written during the year.....	203

Total number of fire policies in force December 1, 1898.....	622
Amount of fire insurance in force December 1, 1897.....	\$528,611
Amount of fire insurance written during the year.....	253,235

Total amount of fire insurance in force December 1, 1898...	\$781,846
Number of tornado policies in force December 1, 1897.....	328
Number of tornado policies written during the year.....	147

Total number of tornado policies in force December 1, 1898.....	475
Amount of tornado insurance in force December 1, 1897.....	\$414,050
Amount of tornado insurance written during the year.....	162,120

Total amount of tornado insurance in force December 1, 1898.	\$586,170
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Losses for the year have been as follows:

W. W. Thompson, Kokomo, Ind., April 4, damage by fire.....	\$17 00
Isaiah Noel, Walton, Ind., May 19, 1898, loss of barn and contents by lightning	212 00
Freeman Daggett, Galveston, Ind., June 3, 1898, damage to barn by wind	9 10
Lydia E. White, Walton, Ind., July 3, horse killed by lightning...	60 00
Ed G. Becker, Sharpsville, Ind., July 3, 1898, three steers killed by lightning	100 00
Geo. W. Harness, Sr., Kokomo, Ind., May 19, 1898, damage to barn by lightning	10 00

Sam A. Powlen, Lucerne, Ind., damage by lightning to barn.....	6 25
Wm. N. Henderson, Cassville, Ind., damage to barn by lightning..	10 00
W. G. Davisson, Galveston, Ind., August 7, 1898, damage to dwelling by lightning	5 00
David Davisson, Galveston, Ind., August 8, 1898, loss double cribs and contents by fire	170 00
Hila Morris, Alto, Ind., August 10, 1898, damage to barn by lightning	5 00
Jonas Parks, Sharpsville, Ind., August 17, 1898, damage to barn by lightning	20 87
D. D. Barnett, Logansport, Ind., June 3, 1898, damage to barn by wind	4 50
John H. Weyand, Lucerne, Ind., services and expenses as actuary for the year	14 50
Losses reported last year and approved by the Auditing Committee assessed against policies then in force.....	30 97
Allowance by directors for uncollected assessments and dues prorated on policies then in force	21 42
	<hr/>
	\$697 34

L. E. COLLIER, Secretary and Delegate.

JACOB L. SMITH, President, Kokomo.

LAWRENCE TOWNSHIP, MARION COUNTY.

Farmers' Insurance Association of Lawrence Township, Marion County, Ind.:

Number of members, about 195.

Number of policies, 225.

Amount insured, \$238,500.

Assessment for year, 35 cents on \$100.

S. T. HAGUE, President,

A. C. BINGER, Secretary,
Castleton, Ind.

J. W. APPLE, Delegate, Oaklandon, Ind.

JEFFERSON COUNTY.

Jefferson County Patrons' Mutual Fire Insurance Company, for the year ending July 31, 1898, and for four months ending December 3, 1898:

Amount in treasury, August 1, 1897.....	\$939 42
Cash received during year	4,940 91
Borrowed	500 00
	<hr/>
Total	\$6,380 02

Cash paid on losses	\$5,185 63	
Cash paid on expense	852 03	
		<hr/> \$6,037 66
Amount in treasury August 1, 1898.....	\$342 37	
Cash received for four months ending December 3, 1898.....	2,468 33	
		<hr/>
Total	\$2,810 70	
Cash paid on losses	\$2,179 02	
Cash paid on expenses	481 35	
		<hr/> \$2,660 37
Amount in treasury December 3, 1898.....	\$150 33	
Bills Collectible—		
Delinquent dues, secured by notes.....	\$103 62	
Delinquent dues on April and July assessment, 1898.....	150 41	
Delinquent dues before April and July assessment, 1898.....	86 27	
Bills Payable—		
Money borrowed	\$600 00	
Number of policies in force end of year.....	1,450	
Amount of policies in force end of year.....	\$1,172,171 00	
Amount of insurance taken during year, including re-		
newals and new issues	235,664 00	
Amount of insurance canceled during the year.....	53,869 00	
Cost of insurance for year ending July 31, 1898, on \$100, 60 cents.		
Yearly average of insurance for six years ending July 31, 1898, on \$100,		
43 cents.		

The losses for the year ending July 31, 1898, are the heaviest since the organization of the company. The assessments made during the year included losses which occurred on and after June 23, 1897, and were 36 in number, and from investigation, as near as could be ascertained, the following causes were assigned:

Six from defective flues; amount, \$2,516.56.

Nine from sparks falling on roof; amount, \$548.38.

Seven supposed to be incendiary (all barns); amount, \$3,199.05.

Ten from lightning; amount, \$238.38.

Four from open fire-places, by coals popping on floor or on chairs with clothing on to dry before the fire; amount, \$22.37.

D. P. MONROE, President and Delegate, Levi.

WM. WATLINGTON, Secretary, Madison.

GIBSON, WARRICK AND VANDERBURGH COUNTIES.

Gibson, Warrick and Vanderburgh Farmers' Mutual Insurance Company.

Organized 1873. Incorporated 1888.

16—Agri.

Number of policies in force January 1, 1899, 1,075. Assessed value of policies, \$1,576,538.75. Number of policies issued during the year ending January 1, 1900, 69. Gain to company, \$118,210. Yearly average of assessments for eleven years ending January 1, 1899, on \$100, 12½ cents.

Total amount paid on losses since incorporated, \$15,259.02. Amount of losses paid during the year, \$1,079.99. Amount canceled by fire and removals, \$10,971.25. The company has a slight balance on hand. Have had no assessment for sixteen months past.

J. T. Morris, President and Delegate, Postoffice, Buckskin.

G. H. Stunkel, Secretary and Delegate, Express Office, Haubstadt.

Garhart Sollman, Treasurer, Postoffice, Ft. Branch.

C. L. Heldt, Appraiser, Postoffice, Elberfeld.

John Market, Appraiser, Postoffice, St. James.

FULTON, WHITE AND PULASKI COUNTIES.

Fulton, White and Pulaski Counties Farmers' Fire Insurance Company, partnership annual statement:

Number of policy holders, 109.

Amount of money on hand January 1, 1899, \$169.16.

Amount of risks, \$70,000.

Expenditures, \$96.70.

Balance on hand, \$72.46.

Loss by fire, \$2.00.

H. A. WILEY, President, Kewanna.

W. L. BOYER, Secretary, Star City.

DECATUR COUNTY.

Patrons' Mutual Insurance Company of Decatur County, Indiana. Annual report, October 8, 1898:

Amount risks beginning of year.....\$1,321,504

Amount risks taken during year..... 220,668

Total risks\$1,542,172

Expense and losses on the \$100 for the year, 23 cents.

C. I. AINSWORTH, President and Delegate, Greensburg.

M. E. PORTER, Secretary, Greensburg.

WAYNE, UNION AND FAYETTE COUNTIES.

Third annual report of the German Baptist Tri-County Mutual Protective Association of Wayne, Union and Fayette Counties, October 1, 1899:

Total amount of risks\$824,850 00

Amount of losses during year 1,726 25

Expenses 172 75

Total expense for year \$1,899 00

Amount of risks taken from October 1, 1898, to January 5, 1899, \$103,-
950.

Last year's assessment, 30 cents on the \$100.

Average assessment for the last two years, 22 cents on the \$100.

JACOB RIFE, President, Boston, Ind.

D. O. DILLING, Secretary, Treasurer and Delegate, Hagerstown, Ind.

DELAWARE COUNTY.

Report of the Delaware County Farmers' Insurance Company:

Organized January 25, 1895.

Total amount of insurance.....\$373,000 00

Total amount of losses paid 4,537 40

Amount of losses for the assessment year ending October 15,
1898 888 40

Cost on the \$100 this year, 27 cents.

Average cost on the \$100 since our organization, in 1895, 46 cents.

Number of members, 305.

ENOCH DRUMM, President,

PERRY V. STEWART, Secretary,

Tabor, Ind.

ENOCH DRUMM, Delegate.

DELAWARE, HENRY AND RANDOLPH COUNTIES.

Third annual report of the German Baptist Tri-County Mutual Protective Association of Delaware, Henry and Randolph Counties:

Liabilities (amount of)\$1,400,000 00

Losses and expenses 5,095 87

Increase in membership, 390.

Increase in liabilities, \$400,000.

Assessment rate, 50 cents on the \$100.

Two losses (damages to barns by lightning).

Two losses of houses, contents, cause unknown.

Four losses of barns and contents, cause unknown.

One loss of horse by lightning.

Respectfully submitted.

L. J. HOOKE, Secretary and Treasurer.

HENDRICKS COUNTY.

Twenty-first annual report of the Farmers' Co-operative Insurance Association of Hendricks County:

Officers for the ensuing year: President, George W. Searce, Danville; Secretary and Treasurer, Simon Hadley, Danville.

Director First District, W. B. Newlin, Pecksburg. Time expires 1899.

Director Second District, W. A. McCormack, Clayton. Time expires 1899.

Director Third District, Evan Hadley, Plainfield. Time expires 1900.

Director Fourth District, Eli Ross, Avon. Time expires 1900.

Director Fifth District, A. A. Surber, Pittsboro. Time expires 1900.

Director Sixth District, Joshua Tharp, Maplewood. Time expires 1900.

Director Seventh District, E. H. Conn, Danville. Time expires 1899.

Number of members, 2,272.

Number insured since last report, 122.

Amount of property now insured, \$3,057,070.

Increased during the year, \$44,979.

Receipts—

From assessment No. 21.....	\$8,619 20
Borrowed money	6,300 00
Membership dues	61 00
Cash on hand at last report	111 66
	<hr/>
	\$15,091 86

General Expenses—

Borrowed money	\$6,500 00
Interest paid	113 21
Postage, printing and stationery.....	90 20
Miscellaneous	49 25
Board of directors	183 75
Secretary and Treasurer	275 00
	<hr/>
Total	\$7,211 31
Total loss and damage	8,073 73
Total expenses	15,285 04
Total receipts	15,091 86
	<hr/>

Overdrawn

\$193 18

Liabilities—

Borrowed money	\$5,035 64
Interest now due	64 62
O. Weesner, colt killed by lightning.....	27 00
Clark Sellars, cow killed by lightning.....	40 00

FARMERS' MUTUAL INSURANCE.

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Record & Hunt, cattle killed by lightning.....	38 00
John Plummer, barn and contents destroyed by lightning....	142 45
Amount overdrawn	193 18

Total \$5,540 89
October 31, 1898.

HENRY COUNTY.

The Henry County Farmers' Mutual Insurance Association was organized August 31, 1895, with a membership of 115, and has increased to 560 members. We have written 672 policies, and have insurance at this time amounting to nearly \$700,000. Our losses during the year have been small, and have made but one assessment since our organization, and that was 20 cents on the \$100. Our company is well organized, and the members are well satisfied.

J. O. MENDENHALL, Secretary and Treasurer.

BENTON AND ADJOINING COUNTIES.

Farmers' Mutual Insurance Association of Benton and the adjoining counties of White and Jasper to Farmers' Mutual Union. The amount of business done in the past year:

Number of policies in force December 31, 1897, 250.

Number of policies written during the year, 165.

Number of policies canceled during the year, 1.

Net increase, 164.

Number of policies in force on December 31, 1898, 414.

Amount insurance in force December 31, 1897.....\$234,913

Amount insurance written during the year..... 173,305

————— \$413,218

Amount of insurance canceled during the year..... 550

Amount insurance in force for year ending December 31, 1898.. \$412,668

Disbursements—

Paid E. Julian, hay, grain, farm implements, etc., burned by

lightning \$100 00

Paid Joseph J. Adams, one steer killed by lightning..... 45 00

Paid Robt. May, one steer killed by lightning..... 38 69

Paid J. S. Vanvoorst, one colt killed by lightning..... 16 67

Paid Lodes Bros., household goods damaged by fire..... 10 15

Paid adjuster official board, incidental expenses, etc..... 42 50

Total disbursements \$251 01

Receipts—

Amount of premium paid to Treasurer	\$195 01
Amount borrowed from bank	120 00
<hr/>	
Total receipts	\$315 01
Dr. to balance on note	56 00

Respectfully,

GEORGE J. BREESE, Secretary.

ALLEN COUNTY.

Farmers' Mutual Fire Insurance Association of Allen County, Indiana:
Report for the fiscal year ending October 10, 1898:

New insurance	\$294,855 00
Insurance canceled	198,620 00
<hr/>	
Net increase for the year	\$96,235 00
Amount of losses sustained and paid during the year.....	\$5,992 06
Expenses other than for losses	862 21
<hr/>	

Total expense to the Association for the year..... \$6,854 27

Amount of insurance in force at the close of the year, \$3,392,000.

WM. A. KELSEY, Secretary, Dunfee.

KOSCIUSKO COUNTY.

Twentieth annual statement of the Farmers' Mutual Relief Association of Kosciusko County, Indiana.. Capital stock, \$1,926,820.

Assessments—Assessment No. 27, December 4, 1897; rate assessed, 15 cents per \$100 insured.

Receipts—

Twenty-seventh assessment	\$2,574 10
Delinquent funds collected	4 20
Sinking fund collected	54 95
<hr/>	
Total receipts	\$2,633 25

Disbursements—Officers—

John C. Wolf, President	\$3 80
H. L. Oldfather, Secretary	32 15
J. W. Hover, Treasurer.....	11 75
J. M. Miller, Actuary	38 45
Jacob Ringgenberg, Director	8 75

FARMERS' MUTUAL INSURANCE.

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S. C. Funk, Director	4 00
S. D. Anglin, Director	3 75
Total	\$102 65
Solicitors for Renewal of Policies—	
Jacob Ringgenberg	\$4 00
William R. Clark	5 25
John M. Miller	3 50
E. M. Idle	3 25
V. H. Gawthrop	1 75
S. D. Anglin	3 50
Braddock Popham	3 50
William Carper	2 50
John C. Wolf	3 50
H. L. Oldfather	7 00
Total	\$37 75
Disbursements—Miscellaneous—	
Stationery, printing, etc.	\$55 05
J. W. Hover, interest on borrowed money	5 00
Total	\$60 05
Summary—	
Money in treasury at last report	\$435 36
Receipts	2,633 25
	\$3,068 61
Disbursements	3,460 43
Balance to account for	391 82
	\$3,068 61

H. L. OLDFATHER, Secretary, Silver Lake.

Audited and approved by Jacob Ringgenberg, S. C. Funk, S. D. Anglin, Directors.

JENNINGS COUNTY.

Seventh annual report for 1898 of the Jennings County Farmers' Fire Association from January 1, 1898, to October 1, 1898:

Amount of capital stock October 1, \$408,576.

Number of policies in force October 1, 442.

Total gain, \$25,035.

Income—

Balance in treasury January 1, 1898.....	\$47 74
January assessment	766 60
Premiums	200 19
Total	\$1,014 53

Losses—

I. Hooten, barn	\$90 00
T. A. Pierce, barn	500 00
P. Manley, horse.....	80 00
A. B. Kiefer, house	200 00
Total	\$870 00

Expenses—

Stamps	\$8 10
Printing order blanks	3 00
Printing 500 envelopes	1 25
Printing 500 reports	2 25
Printing 425 cards	5 25
Printing 100 receipts	1 75
Printing 800 slips to by-laws	1 50
Hall rent for annual meeting	1 00
Office rent and counsel (Lawrence).....	7 50
Error in assessment	4 40
	\$36 00

Officers' Salaries—

Henry Geisel, President	\$15 00
C. Trapp, Vice-President	15 00
James G. Marsh, Treasurer	16 50
W. J. Randall, ex-Treasurer	7 35
G. M. Crist, ex-President	4 50
E. N. Norris	55 90
	\$114 25

Appraisers' Fees—

J. G. Marsh	\$2 00
C. Trapp	12 00
J. W. Morris	11 00
L. Carson	10 40
W. B. Whitcomb	21 00
O. F. Phillips.....	12 00
J. A. Miller	12 80

FARMERS' MUTUAL INSURANCE.

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A. Jordan	3 00
U. E. Smith	6 00
	<hr/>
	\$90 20
Canceled for non-payment assessment.....	\$7 76
Treasurer has collected.....	979 33
Uncollected assessment	35 20
Total disbursements	1,118 21
Leaving treasury overdrawn October 1.....	138 88

E. N. MORRIS, Sec'y.

Secretary's sixth annual report of the Jennings County Farmers' Fire Association for the year ending December 31, 1897:

Amount of capital stock January 1, 1898, \$383,541.00.

Number of members representing stock, 415.

Total gain in 1897, \$52,541.00.

Officers—G. M. Crist, President; J. G. Marsh, Vice-President; W. J. Randall, Treasurer; E. N. Morris, Secretary.

ST. JOSEPH COUNTY.

Report of the Farmers' Mutual Insurance Company of St. Joseph County for the year ending October 1, 1898:

Total number of policies in force, 1,600.

Insuring, \$2,662,010.00.

Total amount of losses accruing during year, \$5,324, or two mills on each dollar of insurance during the year.

Total number of policies issued during the year, 324.

Total number of policies expired by limitation, 322.

The company has been organized for 21 years, and the average cost of each \$1,000 of insurance has been less than \$2.50 per year.

The company now enjoys the full confidence of all the farmers of St. Joseph County, to which county all its business is confined, as well as all the banks and fiscal agencies doing business in the county.

SAMUEL BOWMAN, Pres.

AARON JONES, Sec'y.

TIPTON COUNTY.

Farmers' Insurance Company of Tipton County, Indiana:

President, H. H. Heath, Sharpsville, Ind.; Vice-President, J. J. Paul, Tipton, Ind.; Actuary, Wm. Wiggins, Tipton.

Eight hundred members. Seven hundred and fifty thousand dollars' worth of property insured. Cost to the \$100 last year, 23 cents.

REPORT OF THE WORK IN INDIANA.

Joshua Strange gave the following report upon the work in Indiana:
Mr. President and Gentlemen of the National Mutual Insurance Association:

As I have been placed on the program to represent Indiana at this meeting, the time for obtaining such information necessary, after receiving the program, was too short to do our State justice. Therefore I can but partially show the status of mutual insurance in Indiana.

Mutual insurance among the farmers dates back twenty-nine years, and upon the co-operative plan, prior to any statutory provisions in our State to encourage or protect insurance on the mutual plan. The first law enacted in behalf of mutual insurance was in 1877, and an amendatory act in 1881. Those are the only acts that gave legal life to mutual insurance in Indiana for farmers, and that act confines a company to not more than three contiguous counties.

We are unable to state just the number of companies in the State, but our information is such that we believe that there are now but few counties in the State but what are associated with other counties, or are making an effort to organize. In our State Mutual Union we have gotten in close touch with thirty or more counties. The interest in the Union this year is much greater than any previous year. Our State is composed of ninety-two counties, and those ninety-two counties have about 200,000 farmers. Those 200,000 farmers have, according to the usages of mutual insurance in Indiana, \$300,000,000 worth of risks in round numbers. Those risks without the Farmers' Mutual would cost the farmers of Indiana, by the installment plan and otherwise in old line companies, about \$1,500,000 annually. Take the farmers' mutual companies' reports of the State which are before me, and they show an average cost on the \$100 for the last year 18½ cents, which would have cost the farmers of our State if all were insured in farmers' mutuals last year about \$555,000. But taking the whole time that all companies have done business, the average cost on losses and expense of companies has been less than 18½ cents on the \$100. This shows in our State alone that if all the insurable farm property of the State was insured in the Farmers' Mutual there would be a saving to the farmer annually of about \$1,000,000 in round numbers by doing their own business.

We have the reports from thirty counties. Those counties are in twenty-four companies, and an aggregate of \$36,263,500 of risks. And from the best information we have been able to obtain that amount in those thirty counties is more than one-half of the entire risk taken in Indiana by farmers' mutuals, the approximate estimate would not aggregate over \$50,000,000 in farmers' mutuals in Indiana, which would leave in the hands of the old line companies farm risks to the amount of \$250,000,000.

With above as a basis, would show an annual loss to the farmers carrying their insurance with the old line companies instead of the Farmers' Mutual in Indiana to be \$890,000 in round numbers last year, which becomes alienated to agriculture and a large amount of it to our State.

The companies represented in the Union show that the average amount of insurance per member is about \$1,500, and that the older companies' risks are smaller average per member than the newer companies.

The per cent. of the total amount of loss on the different kinds of risks are as follows:

On dwelling house, contents and out buildings.....	33
On barns, contents and out buildings	60
On stock on farm	7

The per cent. of the cause of losses:

By fire, accidental and carelessness	62
By lightning	32
By incendiary	6

The per cent. of the different amount of losses from the different causes:

Defective flues	33
Sparks on roof and unknown	13
Open fire-places	1
By lightning	6
By incendiary	46

The per cent. of losses of the different kinds of risk of the total losses:

Houses	50
Barns	30
Stock	20

JOSHUA STRANGE,

Secretary Farmers' Mutual Union of Indiana.

TWENTY-FOURTH ANNUAL CONVENTION

OF THE

Indiana Wool Growers' Association

MEETING HELD IN ROOM 11, STATE HOUSE.

Meeting called to order by Mr. Sid Conger, Vice-President, Mr. J. B. Hearnless, President, being absent on account of illness. Letter read from Mr. Hearnless.

Mr. Bell and Mr. Williams were appointed as a committee to invite Governor Mount to appoint a time to speak before the meeting.

Report of the Secretary read by Mr. Robe.

Motion made that Secretary's report be accepted as read.

Seconded and carried.

The first paper read was—

THE FARMER'S SHEEP.

T. J. LINDLEY, WESTFIELD, IND.

The subject assigned me is comprehensive. It has both latitude and longitude to the heart's content, the former extending from the equator to the poles, and the latter only limited by the fertility of the imagination of the writer. One can say anything of a sheepish character from "Mary Had a Little Lamb" to "The Shepherds Kept Their Flocks by Night." He can give a detailed account of the long-tailed, nondescript flocks of the long ago, with more hair than wool upon their backs, and whose bellies had neither wool nor hair, or he can trace evolution backward, beginning with the matchless flocks of the present day, which contribute so much to man's comfort within and without. He can say

a thousand and one things which you already know experimentally, but which he only presumes to be true because he has seen them in fruit; or he could give you a chapter of his experiences, which seem to have been a succession of blunders, despite which he has found "the farmer's sheep" the one factor excelling all others in net profits. The lighthouse at sea is to show the mariner where not to go; hence, if I point out to you some of the pitfalls into which I have fallen, the benefit may perhaps be greater than if, with an assumption of superior knowledge, I proceed to declaim with vehement gestures upon points of management and procedure concerning which you know more than the writer.

My father was a progressive farmer, whose methods in agriculture were far in advance of his neighbors, with perhaps one exception—burs, weeds and brambles were not allowed to grow upon the premises, nor dog-fennel along the public highway—but he died when I was twelve years old, and I have been compelled to learn many important lessons in the dear school of experience. In the fall of 1861, at the age of eighteen, I exchanged my text-book in the classics for a copy of United States Infantry Tactics, and when I returned home on account of impaired health I was unable to resume my work, and chose farming as a profession; but in 1865 I found the procession had moved, and I found it hard work to keep in sight of the advance guard of the agricultural army. So far as "the farmer's sheep" are concerned, I frankly admit that during the two brief years that I have been associated with the gentlemen here assembled as wool growers, I have learned more of the business than I ever knew before.

Some seventeen years ago I built a barn—a good one—resting upon a stone wall two feet thick. The basement thus formed was level with the ground surface on two sides and part of the third, and provided with windows for light and ventilation arranged to be closed in extremely cold weather. A large part of this basement was designed for sheep quarters. My ewes were bred for lambs to come in February, with a view to having them ready for market early in the season.

When the ewes came from the stalk pastures, as lambing time approached, they were in good condition. They were housed carefully and fed liberally upon corn and timothy hay. Now, please don't look wise, roll up your eyebrows and say: "That is not a suitable ration for breeding ewes." I know it, to my sorrow, without your telling, but it cost me a large per cent. of my lamb crop for two years in succession to learn it. Great big lambs weighing eleven or twelve pounds starved to death for the want of milk before I knew what was the matter. In addition to this I soon observed that my sheep were on the down grade, until it gradually dawned upon my obtuse intellect that a warm stable is not a suitable place in which to confine sheep for any considerable length of time. This costly experience resulted in a reformation upon the following lines: Every year I sow my cornfields in rye. I also have an abundance of

bluegrass pasture, one field of which joins my barn. I do not become frightened and think it is going to waste, simply because the stock has not kept it eaten into the ground, but allow it to grow up luxuriantly and fall down. I now breed for March lambs, and can tell within two or three days when the first lambs will be dropped. The ewes are brought in from the pastures fat enough for the block without having eaten a bite of grain. They are shut in every night, but let out at least a part of every day, unless it is raining. While out of doors I keep careful watch over them in anticipation of the advent of the little strangers. I also look after them frequently during the night. I have no more losses on account of ewes not having milk for their young. By April my ewes are usually done lambing, the lambs are well of castrating and docking and ready for the pastures, where they have open sheds if they desire. During lambing time I shift the responsibility of running the government upon the President and Congress and give my attention to my sheep. This may appear selfish—perhaps it is—and, although a little hard on the government, I find the practice profitable.

Our agricultural papers and lecturers at Farmers' Institutes never weary of ringing the changes upon the subject of "clover as the great fertilizer"—I suppose because a truth so palpable will bear frequent repetition.

A new song I would put into their mouths: What contributes so much wealth to his pocket and fertility to his fields as the farmer's sheep, under proper management? Nothing—clover not excepted; and the two combined will make a man a millionaire if he should live long enough.

Through the partiality of his Excellency, the Governor, one year ago, in September, the writer attended the National Road Parliament at Nashville, Tenn., as a delegate, and after the session closed I visited our old army camps near Murfreesboro and the surrounding country. I could not refrain from adopting the exclamation of Miss Ophelia, in "Uncle Tom's Cabin," "How shiftless!" Cotton and indolence everywhere, it being debatable which of the twain was least remunerative. Indolence seems to be a spontaneous production as the result of climatic influence. The scant pickings of cotton from a bankrupt soil by hands not directed by intelligent thought would not pay the taxes upon the valuation placed upon a farm in central Indiana.

Cotton is truly king over that empire, and the tyranny which he exercises over his willing and ignorant subjects is a hundredfold more galling and expressive than that of King George over American colonies. Not a sheep to be seen. The people are trying to raise cotton on land so poor that it ought to be fertilized to make brick, in a country peculiarly adapted to raising sheep, and the climatic conditions are so favorable that the inhabitants could engage in sheep husbandry, thereby enriching the soil and at the same time have better opportunity to indulge their proclivities to court inertia.

For meat, these unprogressive, although hospitable, people depend upon razor-backed woods hogs, with bristles like broom corn and tails like horses, which at seven years old will net from twenty-five to thirty to the quarter, and live and die and go to their final account without ever having experienced the ecstatic delight afforded by a taste of succulent mutton. Oh, rich, juicy, delicious mutton! When prepared by the faithful little wife who provides over my home it can only be compared to the kisses which I stole from her lips when she promised to be my wife.

Although it is true that one who is constitutionally lazy or was "born tired" is not likely to succeed in sheep husbandry (or anything else, for that matter), and although the care of the herd demands diligence and vigilance, yet I know of no employment so remunerative and at the same time so enjoyable for one who is not physically able to endure the harder work upon the farm, than caring for a flock of sheep. There are women wearing themselves out in the slavery of the dairy who would live a great deal longer, get a great deal richer and die a great deal happier, if they would dispose of their cows and churns and invest the proceeds in some ewes and care for them. Not that I advocate making a farm-hand of a woman, for I think that the man who can not, or will not, provide for his household without making his wife and daughters beasts of burden should not have such luxuries as a wife and daughters. There are women upon farms, however, who have no husbands. My mother was left a widow when I was but twelve years of age, and I am very sure that her work in helping me to look after and care for the sheep was neither the hardest nor most disagreeable she had to perform, and the money received from the sale of the wool and the increase of the flock was easiest earned of any of the proceeds of the farm.

It is certainly not expected that one so unqualified to impart instruction as the writer should ever suggest what breed or variety of sheep is best adapted to the common farmer, as different conditions can be best met by different breeds. However, I will state that I have observed that the long, open-wooled sheep in grazing scatter over the pasture at a considerable distance apart, whereas the close-wooled Merinos march forward, nipping the grass with almost the precision of a regiment of soldiers on battalion drill. This suggests to my mind the thought that the long-wools require more elbow room, so to speak, and will suffer more from being crowded closely together than those wearing finer clothes.

It has been the boast of the American people that we were "free and independent," but until the taking effect of the emancipation proclamation the assumption of freedom was false, and until we are able to clothe ourselves without depending upon foreign countries for more than one-half of our wool supply, there will be a cloud over our title to independence.

A proud nation of 70,000,000 people, with conditions so favorable, every State and Territory in the Union being adapted to sheep husbandry, and yet only having sheep equal in number to half our population—it is

supreme folly to pursue a policy which requires us to annually send abroad millions to purchase such necessities of life as wool, and then howl about some imaginary defect in our financial system.

I have little sympathy for the man who voluntarily favors a policy which will inevitably result in the destruction of our flocks and impoverishment of our farms, and our country, and then sit, by the hour, with mouth wide open, and swallow the yawpings of some blatherskite who cares nothing for him or his condition after he has secured his vote.

A celebrated French economist has said that in a free and unrestricted exchange of commodities "that nation will be the greatest sufferer which is the most richly endowed by nature." This can be made very plain by saying that it is very apparent that in an even horse swap the man who has the best horse will be cheated. Let me ask, For what country has nature done so much as for the United States of America? Nowhere on this planet has she scattered her treasures in such rich profusion.

The writer is one who believes that the American toiler should have a seat at the first table, and as the leg of mutton from the farmer's sheep is the greatest delicacy thereon, he should sit at the head of the table and carve.

AS SHEEP RAISERS AND WOOL GROWERS, WHERE ARE WE DRIFTING?

CHARLES ROUNDTREE, YOUNTSVILLE, IND.

Mr. President and Gentlemen of the Indiana Wool Growers' Convention:

Allow me to congratulate you on the splendid outlook for the sheep interests of this country. We are drifting toward brighter and better days for the shepherds of Indiana. With wise and efficient tariff legislation in the interest of wool, the situation has changed since we last met in convention. Some things that were not seen then are more apparent now in the market not only of this country but of the world at large. Fine wools of the Delaine or Merino bloods were almost unsalable and a drug on the markets. From 1892 to 1896, on account of the free importation of wool under the Wilson tariff act, most all of our Merino sheep found their way to the shambles and were wantonly sacrificed. Such a course was drifting the wrong way and we find the situation changed to the extent of a material shortage of the wool, not only in the markets of this country, but of all the world. Fine wools have been steadily increasing in value for the last two years, while coarse wools have been declining in the markets of Europe. Why is this state of affairs existing to-day? It is easy to see the cause for it, with Merino wools at 7 cents per pound and mutton at \$4 a hundred gross weight. We lost sight of the

fact that the time would soon come when these wools would be in great demand by the manufacturers, not only here, but in other countries. This shortage of wools has been foreseen by our wool dealers for the last three years, hence they imported all the fine wools that could be bought in Europe at free wool prices before the present tariff act went into effect, which have supplied their wants up to the present time; but we are glad to say that this enormous supply of wool is about exhausted. It has been a grave mistake in this country by our sheep raisers to breed exclusively for one thing—either wool or mutton. We were not wise in muttonizing our flocks at this time to the detriment of the fleece, but "facts are stubborn things." We should have foreseen the results of the extreme cross-breeding of the mutton breeds from England on the Merino sheep of South American states, which has resulted in a twofold way against us causing an overproduction of coarse wools and creating a strong demand for their mutton in the European markets to our exclusion, or nearly so, in those markets for our heavy sheep. With our export trade in sheep across the water at a low ebb, we are confronted with the fact that our outlet for our heavy sheep is not what it was six or eight years ago. But what has been the facts brought home to us? There is but one answer; that is, we are stuck, and have been drifting. What is the situation to-day in all of our leading markets of this country for sheep? We find the heavy sheep at a large discount in price from the medium-sized, light-boned and quickly matured sheep from 110 to 130 pounds in weight. Such sheep as these command from 50 cents to \$1 per hundred pounds premium over the heavy sheep. "But," says one, "we make the difference in price up in extra weight." But such is not the fact. All animals increase in weight just in proportion to the feed consumed. In breeding for quantity we have lost sight of quality and have done it at the expense of the constitution of our sheep. We have lost sight of the fact that the strongest constitution is to be found in the medium-sized breeds of our domestic animals, more especially sheep. We should breed a combination sheep such as is in demand in our American markets for both wool and mutton. We need not look to the time in the near future for the situation to change, for, with the vast numbers of sheep of good mutton qualities on the plains of South America, Australia and New South Wales to draw from, we will not be able to regain our trade in export sheep in Europe for years to come. In 1892 we had more than 52,000,000 of sheep in the United States, and in 1896, 35,000,000. This was drifting the wrong way. We have at the present time nearly 40,000,000 sheep, which produce 260,000,000 pounds of wool, or six and one-half pounds per head, showing a loss of, in round numbers, 72,000,000 pounds, which is a loss to the sheep industry of this country in the last six years. This is drifting against the rocks. The annual consumption

of mutton in the United States requires nearly 14,000,000 head, which shows plainly to us we are drifting in the right direction by steadily increasing our flocks. As a people we are just learning to consume mutton. With 74,000,000 population we consume less than one sheep per capita. One of the prime reasons for this is the quality of mutton produced. There are some potent reasons for this. First of all, we do not breed to meet the demand for market lambs, as 75 per cent. of the sheep sent to market are lambs, and are of the immature sort. The kind of lambs that will fill the bill are not found in our large, heavy-boned, big-framed sheep. It is impossible to have a first-class early market lamb at six or eight weeks of age by this way of breeding. Another reason for poor mutton is the practice of breeding ewe lambs, which is a sure way to wreck the flock. One more and most potent reason is seeking to produce twin lambs, thus dividing nature's forces and weakening the constitutions of our flocks. Of late years there has been great mortality among the lambs of certain breeds of sheep in this country. Our learned men—"the paper-sheep men"—will tell you it is caused by worms in the stomach and intestines, which is right to a limited extent, but the prime cause is lack of constitution to withstand the ravages of them. All sheep are so infected from birth. But with sound horse sense you can make sheep-raising profitable. In conclusion, let me say to the sheep breeders of Indiana, never cross breed sheep only to make them better for both wool and mutton, and avoid breeding all sheep that produce more than one lamb at a birth. This will apply to breeds as well as to individual sheep.

ADDRESS BY GOVERNOR JAMES A. MOUNT.

Mr. President and Gentlemen of the Wool Growers' Association:

It is not my purpose to make you an address; I simply wish to extend to you a happy New Year and twelve months of prosperity for this year 1899.

I believe, gentlemen, that the wool growers have every reason to be encouraged at the outlook. I believe we are entering upon another year of prosperity to all men engaged in sheep husbandry. It is my belief that there is no branch of farming to-day which has an outlook so bright as the sheep industry. Those of you who were present when I addressed you five years ago remember that I predicted we would pass through a period of great depression to the sheep growers of Indiana. I predicted that flocks would lose millions in numbers. I warned the wool growers against that depression, and warned them to prepare for it, and not make the mistake of abandoning the industry. That is one mistake we make. Without looking at the conditions that tend toward an increase in the profits of that industry, we ought to look at the law of supply and demand. These ought to be the principles that govern us in our business. I predicted then that in five years we would be at the other

extreme when everybody would be anxious to stock up with sheep, and we are there to-day. The number of sheep in the United States at this time, as compared with some years ago, prove that an increase in the demand of mutton and wool is certain.

Some men always get profit out of the farm and some never do out of anything. Some men do not give that attention to the flocks and do not manage them with a judgment which assures success. That class even in a prosperous year may not reap profit by the sheep industry. He who manages his flock with judgment, I am quite certain, will be abundantly rewarded and win greater profits with the sheep husbandry than in the past years. The prices were very gratifying last year. Good lambs brought \$7 and \$8 apiece, and we received good prices for the fleeces and for the mutton.

One great question is the dog question. Indiana passed a dog law especially for sheep—that is, in raising of dogs and sheep—but it is not adequate. The Legislature of Indiana will consider these laws at the convening session. All over this State farmers are stocking up anew and beginning the sheep husbandry again. We ought to have on the Indiana farms four millions of sheep instead of less than a million to-day. If we had, the farmers of this State would have better success and our State would grow richer and farms more sightly, and the whole farming interest in our State would be advanced in prosperity and success. I hope we will have a law on that line that would encourage sheep-raising. I believe farmers ought to have sheep on their farms. I could not manage my farm without sheep. I have to-day as many sheep as I ever had, and see no reason to reduce the number, but rather increase it.

Now, gentlemen, engaged in this industry, let me greet you and congratulate you on the return of prosperity to the sheep industry of the State, and let me say I am hopeful that we may continue to have this prosperity in the coming years.

Mr. President, I did not intend taking this amount of time; I feel I am encroaching upon your time, but my hopes are increased and I intend to continue that branch of farming as long as I am engaged in the business, and I expect to be engaged in the business as long as I live.

Mr. Conger announced that discussions on Mr. Roundtree's paper were in order.

Mr. Tarkington was asked what he had to say on Zenoleum. He remarked that he had no intention of antagonizing that article, for he believed it was an imitation of their own. He thought, however, that naphtholeum was the best and safest dip made. When sheep are immersed they come out in a very pretty state, after being dried in the sun or otherwise. Zenoleum was used all over the country for cattle as well as sheep. For the tick it is especially profitable. As a healing agent it

has no equal, and is a cheap preparation. The cost is one and one-half cents per gallon, and one gallon will dip one hundred sheep.

C. A. Howland, Howland, Ind., was called to the chair in Mr. Sid Conger's absence.

The report of the Treasurer was read.

A motion was made that the report be accepted.

Seconded and carried.

SHOULD EWE LAMBS BE BRED?

W. H. THORNBURG, HILLMAN, IND.

Mr. President and Gentlemen of the Wool Growers' Association:

The subject assigned to me by your worthy committee, "Is It Profitable to Breed Ewe Lambs, and If Not, Why Not?"—my first thought was, "It is not profitable." But it depends upon what you are aiming at. If you only want to increase your number, I might say that it was profitable as far as numbers are concerned—if that is the object for which you are breeding—but if you are breeding for quality and size, it is not profitable. To breed ewe lambs, it lessens the size and reduces the quality. My experience has been that it does not pay to breed ewe lambs until they have quite gotten their growth. I would say, breed them so they will bring lambs the spring they are two years old. I have in my mind two ewe lambs; one of them was the first Shropshire sheep I ever owned, and it was given me by a dear uncle who has gone to the bright, sunny shore. It has been said "that the good always die young," but it was not so with him. When I went out with him to select the lamb, after he had taken the general characteristic into consideration, he then examined the fleece and skin. He then said: "I think this one will do. Now, William, it will pay to feed her well this winter and it will make you money to not breed her this year. Wait and let her get her growth." I thought that would be losing one year's crop of lambs, but those words ring in my ears yet—"It will pay you to wait until she gets her growth."

I followed his advice, and when my lamb was two years old she brought me two big, strong lambs, and when three years old, two more, and when four years old she brought me three lambs, and at the age of five years, one; so you see when my lamb was five years old I had nine sheep in the place of one, and they were all strong and healthy sheep. I was then satisfied uncle had given me good advice.

The other lamb which I have in mind was a very promising one and equally as good a one as the other; many of my hearers would remember her if I should name her. She got with lamb, not with my wish, and

brought lamb along in May. I have heard old men say: "Let your lambs come on the grass; then you need not bother with them." So there was grass in this May, and I did not bother with it. The little fellow did very well for some time, until the flies got bad and the stomach worms got hold of him. Then he did not last long enough to beat the ewe out of a year's growth, which when once lost is forever gone. You can all have late lambs that want them, but if I could have my way my lambs would all come in February. That is the time when you have the most time to look after them, and at the time they are in the barn, and have your lamb creep ready, with the little trough and some good feed in it. The little fellows will soon learn to creep through and nibble at the feed; by the first of April they are great, big fellows, ready for the grass. Then clip the ewes and turn them on the grass, and then you will see them grow.

So you see that by the ewe bringing a lamb when she was one year old she was stunted and lost a year's growth and lost the lamb. The next spring she brought two lambs; they were these round-headed ones, with sharp noses, that as a common thing would weigh about two pounds. I find that all the time you spend trying to get them to the teat is worse than lost. Did you ever work a half day trying to get a wet, limber lamb to the teat? How long can you work and keep sweet? I have heard men say, breed lambs and they will make better mothers. I am sure they will make less mothers, and if there is anything in the saying that "like begets like" you will find it not profitable to breed lambs. And I would say, especially, it is not profitable if you want to improve the size and quality of your sheep. When we are trying to keep up the standard of our herd and endeavoring to increase the quality rather than lower it, then I would say it is not profitable to breed ewe lambs, for the reason that you will injure your flock by destroying the vitality, reduce the size and lower the quality, as it takes these three elements to keep a herd in a condition for a ready market, and without the vitality and the power of endurance we can not make any profit in trying to increase our number.

CAUSE OF THE GREAT FATALITY AMONG LAMBS IN THE SUMMER.

MORTIMER LEVERING, LAFAYETTE, IND.

We have forty-two parasites affecting sheep externally and internally. We have great difficulty in finding what to do to effect a cure of the fatal strongylus contortus in lambs.

Speaking further on this, I want to speak in reference to our friend, Mr. Roundtree's, paper (as to where we are drifting). Now, I am putting in Mr. Roundtree's hands a club to break my own head. I have

also heard a paper later, "Why We Should Not Breed Ewe Lambs." I do not breed them for two years. The lambs must be strong to withstand the parasites which attack them in the summer. We place first, as most destructive in this list, *Contortus*; next tape worm, and then staggers. Turpentine does not rid them of the worm at all. It was tried on a sick sheep, two ounces in the morning, two in the evening, for five days, making ten doses of turpentine, and at the end of the time the lamb was killed and 98 per cent. of the worms in that lamb was living and well, and doing fine on turpentine. It has been proven they will live two hours in 20 per cent. of turpentine.

Letting sheep eat of wet grass and in shade is the principal cause of the worms. The dusty roads is the best place for lambs. The worms thrive under trees where the sun does not dry out the ground, and where there is great shade, and continue to multiply in great numbers. Calysa and iron, one and one-half ounces three times a day, gives strength to sick lambs. Pulverized eureka nut is given very often. Pulverized resin in dry feed is also another remedy. Most twisted stomach worms come through dogs. Dogs may destroy sheep with their teeth, but they are a hundred times more destructive for being mediums for producing these worms. Worms kill more sheep than dogs. The worms early laid in flesh and eaten by dogs are dropped in droppings on wet ground, and their eggs are hatched out and in about fifteen days they come to perfection, and then, in the bowels of the sheep, they are self-reproducing.

I suggest you remove any flock of lambs immediately for treatment to new dry pasture and keep pasture free from dogs. The pasture on which have been pastured, which were afflicted with the twisted stomach worm, should not be pastured until after the ground had been frozen. The kind of shade sheep want to keep away parasites is a low platform. It is noticed that sheep will shelter under a wagon bed, and this is because they get so close to the top that the fly or bot-fly cannot affect them. For one hundred sheep I would say build the platform thirty inches high, or large enough only to cover sheep, eight feet wide and thirty long, and build where there is a slight drainage.

The tape worm, of course, is more easily gotten rid of than the twisted stomach worm. Keep sheep up and feed for twenty-four hours, giving just a little water, and give a powerful vermifuge. Then, again, all droppings from this place should be burned, for every joint of the tape worm is self-reproducing.

Mr. Lindley asked how to diagnose a case of tape worm.

Mr. Levering: You will find that the sheep have a ravenous appetite, and if you examine carefully the droppings you will find small, white segments. The twisted stomach worms look as though they are one and one-half inches long and made together. When alive they are brown and when dead they are white. There will be thousands in a stomach of a four-months lamb.

Mr. Quick: Is Summer's Worm Powder sufficient to get away with worms?

Mr. Levering: Animals become immune to medicine, and one kind of medicine will lose its power, and another will then have to be used.

Mr. Cowgill said he doctored sheep only by giving them sulphur with salt; pastured them on blue-grass pasture, which had not been broken for thirty years, and has a dark barn for them to shelter in when the weather is warm and flies are bad.

Mr. Roundtree: I entered the convention with the best of feeling to every man, and have no clubs to throw, and if I had I should not use them. I am raising sheep on a fifty-year-old pasture, and the water they drink is pumped up out of a mineral well into tanks. When I lost lambs I introduced new blood and stronger blood. Last year out of one hundred and fifty-four lambs I only lost three. I do not have an ounce of worm powder; I simply give sheep and lambs sulphur along with salt. I believe we can reach worms through sulphur.

Mr. Howland: What is stronger blood?

Mr. Roundtree: Shropshires and South Down blood crossed give stronger constitutions, and then introduce Merino blood; and to-day I am crossing blood with the Tunis sheep.

Mr. Williams: I do not think sulphur will eradicate worms. When you notice the first symptoms give some good vermifuge. When lambs are first weaned give them a drench of turpentine and camphor. Remove the cause and you will have no trouble.

Mr. Robe moved that the Chair appoint a committee to prepare a program for the next meeting. Motion seconded, and carried.

The Chair appointed Messrs. Walter J. Quick, "Cal." Darnell, "Sid." Conger, Professor Bell and J. W. Robe.

Mr. "Sid." Conger made a motion to adjourn till next morning at 9 o'clock.

Motion carried.

SECOND SESSION.

Meeting called to order at 9 o'clock a. m., Wednesday morning, January 4th.

The first paper read was—

THE RELATIVE BENEFITS OF SHEEP INDUSTRY TO NATIONAL PROSPERITY.

I. N. MILLER, UPLANDS, IND.

Sheep are credited with being the first animals domesticated by man. Probably soon after the fall in Eden, and the consequent need for novel-

ties in wearing apparel, they were first domesticated. At any rate, the seclusive avocation of keeping a garden and the tempting allurements of horticulture compelled his Lordship to resort to tilling the soil, and the first scion of beguiling influences followed the pursuit last engaged in by paterfamilias, but the second cherub became a keeper of sheep, and when in the process of time an exhibition was held for well-doing, the premium was awarded to the boy who could produce an article of greatest profit and retain the source of value in the land with ultimate gain for the inhabitants thereof.

The herds and flocks of Abraham, of Isaac and of Jacob (the record breaker), require no comment here as the source of prosperity, and maintaining the covenant granted them by the great Jehovah and Master of the Hebrews.

Long before the Romans invaded ancient Britain, whose possessions consisted largely of sheep kept for the wool, their value was zealously guarded as contributing immeasurable benefits to the yeomanry.

The discovery of the New World and its subsequent conquest for gold, the century following, became as futile efforts in well-doing, and not until the introduction of sheep, in 1609, by the Jamestown colony, under their beneficent leader and intrepid commander, did the era of civilizing influences begin in America, whereby a people could become self-supporting.

Other importations followed, and the flocks increased throughout the several colonies, from the fair Carolinas, in the south, to the verdant hill-sides, north, beyond the waters of the beautiful Connecticut.

Next we see Columbia becoming a child of independent spirit, with ideas of going to housekeeping on her own account, notwithstanding objections made by the maternal ancestor across the pond. As a matter of fact, the Old Dame thought to chastize her offspring and bring her into submission, but to that the fair young miss objected, declaring that she was quite able to take care of herself, and began organizing socials, tea parties, wool pickings and spinning bees, that proved of great benefit in realizing the highest hopes of the people. And not soon to be forgotten is the fact that the sheep industry contributed to the national prosperity. It has been demonstrated, both in time of peace and in time of war, becoming sacredly and inseparably connected with the advent of new settlements. No instance of more importance can be cited than that of civilizing the great Northwest territory beyond the Ohio, a part of which we take pride in claiming as this Commonwealth. But for the sheep brought along with many of the pioneers' families, a great many blessings and comforts would have been wanting, for the wool of these sheep was made into garments, known in the vernacular phrase as "homespun."

The many incidents relative to keeping the proverbial "little flock" are now only a matter of history, as there are but few surviving wit-

nesses of the once familiar home industry of picking, carding, coloring, spinning and weaving of the wool into cloth for family use. A common article of the household equipment in those days was the spinning wheel, the reel and the loom, which occupied places in the ordinary living apartments.

Although the old way has been replaced by the new in the manufacture of woollen fabrics, the demand will continue, according to conditions, latitude and requirements, for raiment made from the best material—the fleece of the sheep. Another advantage is the producing of an excellent quality of mutton for the millions, and bespeaks a continued interest in sheep husbandry, alike of relative benefit individually and collectively, to the producer and to the manufacturer, and national prosperity for all.

Now, a word as to the different breeds of sheep. The subject is at this time one of great importance for those contemplating sheep husbandry, as well as for those already engaged in the business.

Animals are greatly influenced by the climate and the quality of the food upon which they subsist. Sheep are no exception to this rule, and they are voracious feeders on plant food. Selection, care and intelligent feeding in the moist climate of England, the feed being largely succulent fodder and root crops, have developed several classes of sheep, known as the mutton breeds.

Our importations in recent years have been mainly of the type noted for the excellence of the mutton, uniformity of carcass, early maturity and exceedingly good weight. Hence it is not surprising, with the prevailing low price of wool, that breeders of small flocks prefer the more distinctively mutton breeds, and the Shropshire seems to have held their supremacy in this particular for well on to a quarter of a century. However, the supply of breeding stock has been constantly brought from the source, or fountain head, of production, in England. The best results are obtained with the second and third generation in our dryer climate, for much of the original type is lost, and they become less valuable for want of superior size and finish.

Consequently, the question is debatable, how far this type of sheep has been improved upon here, if any, but for the necessity of the infusing of fresh blood from the mother country, where climatic influences and methods of feeding and the quality of the food is different.

About the Merino type of sheep more can be said in their favor in this respect than other types, for they have been improved materially, both in their wool and mutton quality, and go right on in this country, proving that they are right at home with the climatic conditions and dryer herbage due to greffater altitude, thriving on the larger quantities of succulent food and in larger flocks kept on the farms of America.

Mr. Bristol: We are improving on the Dorsets. They grow better here than they do in England. We can claim more for them.

Mr. Miller: They have a compact fleece and a hardness in their characteristics that will do for outdoor raising.

Mr. Bristol: Our climate here is somewhat like their native country's, but their environment is better, consequently they improve.

Mr. Robe: Have we not improved on the English breed of sheep generally?

Mr. Bristol: No; not generally.

Mr. Howland: Of course, the Spanish sheep, the Merino, was a very popular sheep many years ago. It has been here a long time, and is acclimated, but it always was a hardy sheep, and is to-day. It is really holding its own, and is the equal of any sheep ever imported to this country.

As to whether we have improved the Shropshire, which is called by some "the mortgage lifter," I do not know. I am of the opinion that some other breed will help take the mortgage off just as well. When they come over from England they are certainly beautiful to look at, but they seem to fade out in this country to a certain extent. Whether they will do better when they become acclimated, I do not know. The first Shropshire sheep I ever saw was about thirty years ago, and they were brought over by Governor Joseph A. Wright. They were beautiful sheep when he first brought them over, but they did not look so well after they had been here a year. I really believe there is a deterioration of the Shropshire sheep brought from the old country to this, and I have never seen as fine a specimen of the Shropshire breed in this country as I have seen brought from England. I hope others have had a better experience with them than I have. I think there are other breeds with stronger constitutions for this country. I think the best flock I ever owned were called just common sheep—they were not common, but very uncommon sheep. They were so hardy I could turn them out in the field, and they were always fat and sleek, and their offspring were hearty. They were never troubled with worms in the stomach, because they were too hearty to allow them to remain there.

Marion Willams: I cannot concur in all that has been said about these sheep. I have watched the different breeds, and I think there has been a vast improvement in all of them, and if there had not been some of them would have dropped out. You can imagine them and keep their good qualities up just as well here as you can in England. We can breed them just as well here as they breed them in England. It is true that you cannot produce a yearling with the bloom you can get on one brought from England, but when they come to maturity the American bred sheep will stand well beside the imported one. Now, as to seen

bloom of the yearling. It is just like a person being put in the sun and hot dry air; he will not have the bloom on his face that he would have if he had been in a moist climate. Now, these yearlings will look as if they would weigh a great deal more than the American-bred sheep, but put them on the scales and the American-bred sheep will out-weigh the English. The English sheep is more moist and sappy, and the fleece is more oily. I think as a rule the lambs and yearlings raised in this country are better than the imported ones.

Mr. Thornburg: Some of the breeders have a mistaken idea about going to our fairs and buying sheep that have been housed and have been in the care of the best shepherds in the country, and then taking them and putting them on the grass and expecting them to keep up the same bloom and appearance they had when they got them. Take our Shropshire sheep in this country and give them the same care they do in England and we will see the same appearance in the sheep.

Now, in speaking of the old-fashioned sheep, that have done better and kept fat in the pasture. That is one great objection I have to the Shropshires; that they get too fat. I have trouble in keeping the ewes lean enough.

Marion Williams: I do not think you can ever get a Shropshire too fat to breed good lambs.

Mr. Roundtree: I am glad that one point has been brought out, and that is in regard to constitution of our sheep. Some one here made the statement that it was wrong to buy show sheep that are pampered as they pamper them in England. He says that when they are turned out they lose their vitality. Now, that is one of the strongest statements I have heard admitted here by the breeders of this particular class of sheep. If you have the constitution in your sheep in England, and he is fatted and brought here in this fine shape, if the constitution is there it will be there when you put him out in the pasture. That is one of the strong points against that breed of sheep. Another thing spoken of in the paper was in regard to the Dorset sheep. The Dorsets are English sheep. The Dorset has made some improvement since coming to this country, and I honestly believe this breed will be a great one for America, but they have been improved upon. The best Dorsets from England have not been brought here yet. The Cheviots, of Scotland, will be a great sheep for this country. The Cheviot is a mountain sheep, and, with all other mountain breeds, have a good constitution and will do well in this country.

Mr. Robe: I had a neighbor who bought a cow from another farmer in the same neighborhood, and she did not do what he said she would, and the farmer went and complained to the man who sold her, and he said: "Well, I sold you the cow, but I did not sell you my blue-grass pasture." Now, that is the way with the sheep. The English sheep is kept on the best of feed, kept out of the sun, and furnished everything that will

bring it to the best form. Now, that sheep will go down when put in another pasture and in another environment.

Mr. Williams: In speaking of too fat animals for breeding, I do not mean that they should not have plenty of exercise. Give them plenty of exercise and they will be good breeders. If the imported sheep did not have good constitutions they would not stand the treatment they are given to make them the show animals they are.

Mr. Guthrie: It was my pleasure a few years ago to visit some of the best herds of Down sheep in England, and I was struck with the contrast of their sheep with ours. I think there is something in the climate that makes the difference. I thought we had some good sheep, but when I got there and visited the flocks of several hundred sheep, and could not tell one sheep from another—they all looked alike—I was astonished. I think the climate has a great deal to do with it. Then, I find that we do not practice here some things that they do there. The principal breeders do not keep the sheep longer than to breed two lambs. We keep them as long as we succeed in raising lambs. My experience is that there is not much money in breeding fine sheep. I breed sheep for the money in them, and I do not keep a flock for any great length of time. If you change sheep often they will do better.

Mr. Robe: They breed over there first for mutton and then for wool; we breed first for wool and then for mutton.

Mr. Guthrie: A great many of their flocks are fed on root crops.

Marion Williams: The sheep fed on root crops get less exercise than the flocks fed out doors. Of course, corn is not fed to any extent, because our corn will sell there for fifty cents a bushel, and it would be too expensive. One reason why they do not keep the females longer is because they lose their teeth and can not gnaw the turnips. Then, they have a great many more diseases among their sheep than we have here.

Mr. Miller: My observation is that plant food and timothy and clover find their latitude, and so do sheep. Some breeders complain that they cannot maintain the excellence of their flocks. There is room for all breeds in this country, and the flocks have a great deal to do with the success in raising. If you cannot raise one kind of sheep successfully, try another kind that are better suited to the climate you are in.

Mr. Williams: We can maintain them here as well as they can in England if we give them the same care and time and attention; but we do not, we are in too much of a hurry. There a man and a boy will be given two or three hundred sheep to look after, and they have nothing to do but take care of them. They drench the lambs and are constantly feeding the sheep something to keep them in good condition. I think that the wages paid to shepherds there are not more than \$3.00 a week; I speak of the shepherds now that were on Mr. Treadwell's place. This shepherd's boys worked for nothing until they were twelve years old, and then they were only paid a few shillings a week.

Mr. Thornburg: The best shepherd I ever knew in this country was the shepherd who brought the flock of horned Dorsets to our fair last fall. His sheep had the best bloom on them and were in the best condition of any flock on the ground. They must have a certain amount of care and careful feeding or they will not have this bloom.

PROFITS OF SHEEP AS COMPARED WITH OTHER PURSUITS ON THE FARM.

C. A. HOWLAND, HOWLAND, IND.

Over production in any one thing the farmer raises will gorge the market and correspondingly lower prices and make the production of that thing unprofitable. Forty years ago, if I were asked the most profitable stock to raise I should have told you that horses were, and next to them hogs. They were the profitable kind forty years ago. A three-year-old horse then would sell for three times the value of a three-year-old steer. To-day how is it? The three-year-old horse will not bring any more than the three-year-old steer. Now, so far as the horse is concerned, circumstances have been working against its value. Science has contributed various motive powers that have taken the place of the horse to a certain extent; consequently, he is not in the demand that he was forty years ago, when we had not these scientific appliances that we have to-day. Again, the horse is a hard thing to fence against.

Forty years ago the hog was a hearty, robust animal, that we could produce in any quantity, and we felt safe when we had a large number of hogs preparing for the butcher; we expected to carry them through. To-day hog disease makes the pork business a very uncertain one, and whoever gets a large number of hogs together in one drove is very liable to lose a small fortune; consequently, to-day I would call the hog business an unprofitable business.

Again, the raising of hogs requires the raising of a great deal of corn, and there is a great deal of hard work about raising corn that I never did like. The raising of all cereals is hard work, and it also has a drawback from the fact that the farmer who continually plants his soil in corn or wheat takes from the soil much of that fertility it must have in order to make any crop a paying business. That is an objection to the raising of cereals. Now, then, what is best under these circumstances? While I believe in mixed husbandry, I believe that the farmer should have nearly everything on the farm, and if one thing is not in good demand another thing will be. Then, what kind of stock shall we keep in order to make it profitable for the labor and capital invested in said

stock? All sheep men will say that sheep are the best stock to raise. The sheep will not only return to the owner a fair profit for his capital and labor, but will, at the same time, enrich the farm on which they run and make that farm more valuable for the raising of any kind of crops. I do not wish to be unfair to the other stock; I do not wish to say, as a great many men who raise a particular kind of stock say, that the kind of stock they fancy is the only one to raise. I know that sheep have their drawbacks as well as any other kind of stock. For forty years I have been handling stock, and for these forty consecutive years I have had nothing but good luck with sheep.

Sheep and cattle stand nearer together than any kind of stock we have. I am going to make a comparison between these two kinds of stock, and I want to be fair about it. Now, take the cow. My idea of a good cow is some good beef breed, preferably a shorthorn cow. Then take eight good ewes of any good breed. The cow will drop one calf in the year. I can keep the eight ewes for what I can keep the one cow. The calf would be worth from \$6 to \$8 when ready for the butcher. Take the eight ewes and they have raised eight lambs, and they are worth \$4 to \$5 apiece when ready for the butcher. In this case you have \$20 on the side of the sheep. If you raise the calf to a yearling he is worth from \$20 to \$25. The eight lambs as yearlings would be worth \$40 dollars. You will say that after you have sold the calf you have the milk. Suppose you milk the cow for 150 days. You have the work of milking to do, and, on the other hand, I have the eight fleeces, or the sixteen, as the case may be, to offset your milk. The fleeces are no trouble to raise, but you have to work with the milk every day.

Then, I want the stock that will make my ground worth more money. I am satisfied that at the end of the year I will have \$40 more from the sheep and with less labor. Still, sheep and cattle should be always kept on the farm; you need them both. They are both good fertilizers, but cattle are harder to fence against.

Now, you may judge between the two; my preference is always for the sheep. Values may change as time goes by. To me it seems as though the outlook is very promising. The signs of the times indicate that for the next decade at least the sheep business would be a very profitable business. I have heard farmers say they did not keep sheep, that they were in favor of free wool. What right has any man to say a word about my business? This is a free country, and the sheep business is free to any one who wishes to go into it. If you have not, as a farmer, got understanding enough to see the profits and beauty in sheep husbandry, then do have sense enough to leave the business of those who do raise sheep alone. The truth is, it would be to the benefit of all farmers to produce the wool in the United States that is manufactured in the United States. That would be wisdom on the part of the farmer,

and I say to you, gentlemen, don't let the Congressmen and Senators get away with that which rightly belongs in the West. Now is a very opportune time to talk to your Senators, and say to them, "If you cannot equal those New England fellows that are all manufacturers, that work in the interests of manufacturers and not in the interests of wool-growers; if you are not competent to compete with those fellows, then we don't want you to look after our interests. See that your Senators and Congressmen appreciate the great interests of the wool-growers of the West.

MUTTON VS. BEEF; COST OF PRODUCTION.

BY C. S. PLUMB.

The real complete cost of producing live meat of any kind depends upon a variety of conditions—breed of animal, kind and amount of food used, cost of food, price of labor, value of land animals are kept upon, shelter investment, taxes and, perhaps, insurance. There is also another factor in cost, which too often is not taken into account, and that is the adaptability of the feeder to his work. While it is true that but few men are willing to admit that they are not good feeders, it is equally true that good feeders are the exception, and not the rule. In fact, one is almost justified in saying that, like poets, good feeders are born, not made.

While these several features determine the cost of production, two of them have a much greater bearing on the matter than all the others combined, viz.: The type of animal fed and the feeder.

The type of animal may be the leggy, narrow-backed, shallow-bodied, cat-hammed style, or of the short-legged, broad-backed, well-ribbed, deep-bodied, full-hammed style. The former, of course, is an unprofitable feeder, while the latter is of the meaty sort, that lays on flesh. The cost of production with the one may be double what it is with the other, and, in any event, will be much greater, so that all profit will be lost, if the animals are not even fed at a loss.

The feeder may be one of those sympathetic, patient, observing fellows, who talks like a friend to the animals about him and treats them as such, and who sees more than one kind of appetite and disposition in his flock that needs his attention; or he may be a rough, noisy, hasty, thoughtless man, who never hesitates to apply his boot to one of the many animals about him, which, so far as he can see, are all alike in their needs and dispositions. The former is the man who makes money handling stock, while the latter rarely does, and he is the one who will tell you, "Sheep don't pay."

One of the reasons, I believe, why Englishmen and Scotchmen are so successful, as a rule, in handling live stock, lies in their sympathetic interest in the animals about them.

The constant presence of sheep all over England and Scotland, and the great interest taken in stock, shown by both men and women on the other side, as they crowd about the pens and rings to a degree unknown in America, are indications of the difference in natural interest taken in live stock between the Yankee and the native Briton. As a people, we Americans need to learn to love and appreciate our dumb beasts more than we now do, if we wish to secure the best returns, no matter in what direction we are aiming.

Another most important item in the cost of production, is the value of land or pasture on which the sheep are fed. In the Argentine Republic food than the pastures of the free pampas or cheap lands of the country. So that the cost of production is reduced to a minimum. These sheep, however, are very cheap, selling for from fifty to seventy-five cents each in the flock. On our western plains neither feed nor sheep are as cheap as this, but it is quite in contrast with the cost of production on our lands of the middle West, which have a valuation of \$40 to \$50 per acre in many cases, and where both feeders and feeds are far more costly than beyond the Mississippi. Yet, under the circumstances, we are obliged to consider the question from our home standpoint and home conditions.

While the writer is not in a position to draw a direct comparison between mutton and beef production, on the basis of experiments conducted at the Indiana station, I will present for your consideration a statement published by Prof. C. F. Curtiss, in which such a comparison is made. * Professor Curtiss writes:

"At the Iowa station we are now feeding fourteen head of Hereford cattle, coming two years old, and ninety-nine head of pure-bred lambs (ten each, with one exception) of ten breeds. Neither experiment is yet completed, but the feed record for the month of January affords an interesting comparison. Both sheep and cattle made unusually good gains during that month, and the comparison is in all respects a fair one, or as nearly so as may readily be obtained, in comparing two separate lots of animals being prepared for market under similar conditions. Both are being fed to their full capacity, on rations much alike, and they are about equally advanced in the fattening process. The gain made by the sheep averages .44 pounds per head daily, and that by the cattle .77 pounds. The feeding record reveals some interesting comparisons. The first observation is that the sheep consumed more feed per 1,000 pounds of live weight than the cattle, and that they also made better returns in gain from corresponding amounts. The cattle consumed 21.3 pounds of feed (dry matter) per 1,000 pounds of live weight daily, and the sheep con-

* *Breeders' Gazette*, March 18. 1896.

sumed 29.9 pounds, and it required 9.11 pounds of feed (dry matter) for a pound of gain on the cattle and 7.64 pounds on the sheep. The cost of feed per pound of gain was 3.62 cents by the cattle and 3.32 cents by the sheep."

These figures rather favor the sheep.

In general practice, it is quite conceded by those familiar with handling cattle and sheep, that for the money invested the sheep, as a rule, pay the biggest interest on the investment. To be sure, on most farms the sheep are relegated to an inferior position, when compared with the cattle, but undoubtedly were the stockman to carry his sheep on a fairly good scale they would make a much better financial showing when checked up against the cattle than many commonly think for.

This much is certain. If we breed or use a class of sheep of good quality, and feed them intelligently, year in and year out, we shall be fairly sure of making a reasonable profit on our investment. The same may be fairly said of the producer of beef. And what we want right now in our State is larger herds of cattle and larger flocks of sheep, and a more important development of our live stock industry. It will mean greater prosperity for the State and the farmer in increased fertility of soil and better income to the farmer. We should ship less grain from our midst and feed more sheep and cattle.

Mr. Cotton: I have kept sheep for forty years and found them to be profitable. They are good grazers and keep farms in nicer condition than any other animal, but a farmer ought to keep other stock, for if he has one kind of stock and the price drops he is left. I differ with Mr. Howland in regard to the hog. When the diet of the hog was brought down to one grain, and that corn, then we found cholera. When my hogs had free access to clover and different kinds of feed, I never had any trouble with hog cholera.

After a long discussion, it was moved and carried that it be left to the Executive Committee to arrange the meetings of the Indiana Wool-Growers' Association, so they would not convene at the same time of the State Board meetings.

WHAT BENEFITS DOES THE AVERAGE FARMER AND SHEEP BREEDER DERIVE BY ATTENDING THE AGRICULTURAL FAIRS AND WATCHING THE JUDGING ?

JOHN L. THOMPSON, GAS CITY, IND.

An agricultural fair is an educational medium. Here, once a year, the people of the State have an opportunity to examine the different types of products of the farm and shop, whether they be crops, live stock or

machinery. The smaller the fair, the less the opportunity for the visitors to see these types, while the larger the fair the better the opportunity. And so, it naturally follows, that the State Fair, the highest and largest phase of our fair development, offers to the visitor the best chance for informing himself concerning the things there shown. Here are brought together exhibits from all over our own State, as well as from other States, often situated many miles from our border.

A museum is an educational exhibition, and for many years museums have had a recognized place in education, as is shown by their establishment in the leading institutions of higher learning, and in great cities all over the civilized world. In certain well-defined directions, in its collections shown for exhibition, an agricultural fair represents a temporary museum. If properly managed, both should produce good results.

One feature of the exhibition at a fair is its cattle, and in our great Central West this is an important item. At the show of the Royal Agricultural Society of England, in 1897, nearly 900 head of the finest cattle of England, Scotland, Ireland and Wales were exhibited. At our own State Fair and other State Fairs hundreds of head of cattle are exhibited each year, that represents the highest stage of the breeder's art. In 1898 there was entered for exhibition at the Indiana State Fair 530 head of cattle, representing ten different breeds. Think of what a show that was!

Now, how does this cattle show benefit the cattle interest of the State? For it is through this exhibit that the State Fair benefits our cattle interests, if at all. This is accomplished in several directions, by affording opportunities to—

1. Study specimens of one breed.
2. Compare breeds.
3. Introduce new or little-known breeds to the public.
4. General influence on casual visitors.
5. Exhibitors and visitors to meet, for acquaintance and business.
6. Breeders to compare notes.
7. See how animals are fixed or fitted for exhibition.
8. Learn what the market demands.

Let us briefly consider these different points.

1. OPPORTUNITY TO STUDY ONE BREED.

There are many breeders in the State who await eagerly the annual State Fair, that they may visit those animals on exhibition representing a breed they are handling, that they may study high-class examples of the breed. It is to their advantage to inspect these animals, to study the size, body, type, handling, bone, hair and flesh quality, and see wherein qualities exist that are superior to those in stock of their own breeding, and which they should create in their own herds. How many

earnest shorthorn breeders have been influenced to visit the Indiana State Fair and study the character of Gay Monarch or Mary Abbotsburn, and what inspirations have these animals created? No one can tell, but without question, the Robbins, Van Natta, Nave, Miller, Douglas, Goodwin and Judy, Heavilon, La Grange, Raab, Stanton, Wheatcraft and many others, through State Fair lessons, have improved their herds and so added to the fame and wealth of Indiana as a State producing fine cattle. I think this is unquestionably true.

2. COMPARE BREEDS.

There are many people who have no better opportunity to draw comparison between the several breeds, where it relates to type, than at the agricultural fair or stock show. The interested person may visit the cattle barns, inspect individuals of different breeds, make comparisons; may talk with the breeders, and when the breeds are in competition for sweepstakes he has an opportunity to draw group comparisons. These are really valuable opportunities, and nowhere does one secure such, unless at the fair. Consequently, its importance should not be overlooked. Evidence seen in such examinations may often cause the examiner to arrive at conclusions that otherwise he may not have reached.

3. INTRODUCE NEW OR LITTLE KNOWN BREEDS TO THE PUBLIC.

To-day the State Fair offers a superior medium for advertising the different breeds. Fifty or 100,000 people may inspect the contents of the cattle barns during the week. Some of these are looking for novelties. Special inquiries are made relative to a breed but little known. Polled Durhams, Red Polls, Dutch Belted, Guernsey and Ayrshire are examined as candidates for public favor, with which the masses are but little acquainted. And this State Fair contact increases the knowledge of the breed and induces others, perhaps, to purchase, and number themselves among its advocates and breeders.

At the Trans-Mississippi Exposition, at Omaha, this year, was shown a pen of polled grade Hereford cattle, the results of a certain line of breeding of Judge Guthrie, of Kansas. He stated to me that through the press the public had learned of these cattle, and he had received so many letters asking for information concerning them, that he thought it would be a good plan to show them at Omaha. This he did, and much interest was shown in them, visitors constantly looking them over.

This is simply an illustration of the value of showing a new breed at a fair. During some years back Mr. J. H. Miller, of this State, showed a herd of Polled Durham cattle at our State Fair, and placed them in the show ring in competition. In these days Mr. Miller was establishing a herd, and he used the fair as one of the means for advertising it. To-day

he is known as one of the foremost breeders of this class of cattle in America, and has shipped Polled Durhams extensively over the United States, and even to foreign countries. It is reasonable to assume that the State Fair played its part in making this breed better known, and Indiana as the place where good specimens could be bought.

4. GENERAL INFLUENCE ON CASUAL VISITORS.

Thousands throng the fair grounds and stroll from object to object in idle curiosity, but here and there something strikes the eye and engages the attention of one of these idlers, that makes an impression of a lasting nature. And here people become interested in cattle who heretofore had supposed them uninteresting and unattractive. Of the thousands sitting on the grand-stand watching the judging, some, at least, for the first time, become more than superficially interested. A row of magnificent dairy cows, with widely-distended udders, may point to dairy possibilities he had never dreamed of or thought possible.

And a dozen broad-backed, deep-bodied, thick-chested, beautiful beef cattle, side by side, may show him a beef development that will inspire him to the creation of the like himself.

The influence of this stock on the crowd cannot be measured in any definite manner, yet undoubtedly it is far greater than most of us realize.

5. EXHIBITORS AND VISITORS MEET FOR ACQUAINTANCE AND BUSINESS.

Engagements are made by breeders and their correspondents at the fair, where animals are inspected and an opportunity afforded for consideration of matters which will give far greater satisfaction than can be secured through correspondence. Many points can be brought out where buyer and seller meet before the animals, that cannot of necessity be made clear through correspondence. In another direction, the breeder or exhibitor will often take pains to interest visitors to the stock in the barns, and so stimulate an acquaintance in live-stock matters. The parading of the animals before the visitors and the distribution of literature concerning the individual herd or breed will certainly stimulate some thought in the right direction.

6. BREEDERS COMPARE NOTES.

The men who go the rounds of the fairs and show live stock represent, in a general way, the most progressive and intelligent breeder that we have. Most of them are constantly seeking for new information, that will enable them to breed better animals, and so strengthen their herds. Every time a number of breeders get together they compare notes, discuss individuals, types, food-stuffs, methods of treatment, etc. These men are found in large numbers at the fairs, and they do more to keep the stand-

ard of breeding high—they do more to improve the quality of the stock of the country, whether it be in the feeder's or breeder's lot—than we can possibly estimate. There are breeders in this State who show year after year at the fair, whose high-class males are or have been in service in herds of all kinds for years in Indiana. Theirs is the blood—secured through intelligence, exacting care, patience, toll and outlay of money—that gives standing to many herds of this State, that have only a local influence, yet which are a credit to their owners. And when these breeders, tried and experienced, get together, many ideas are exchanged, some of which eventually work to the advantage of the State. Unless they meet in special sessions, in regular organization, such as in a live stock association, breeders have no place equal to the fair grounds and showing for exchanging experiences and getting new ideas.

7. SEE HOW ANIMALS ARE FIXED OR FITTED FOR EXHIBITION AND METHODS OF SHOWING.

A good business man desires to exhibit his goods so as to show to the best advantage and thus promote trade. This applies most emphatically to the man who shows live stock at the fair. Animals brought in from the field and shown in an indifferent manner never attract the attention of the crowd or win prizes, as do those that are fitted for the exhibition and are then shown to best advantage. While the operation of fitting begins months before the show, during the exhibition people may, if they will, learn of the foods used and methods of feeding, and may note practices that are followed to improve the appearances of the animals, such as polishing hoofs and horns, grooming, training, etc. And in some showing some men have their stock trained to attention in a manner worthy of an old soldier, while other beasts, in less expert hands, are uneasy, are often in ungainly positions, and so show at a disadvantage.

In this respect the State Fair serves as a valuable medium for the stockman to get ideas, in that it will enable him to present his animals in the most attractive form before the public. It is true, you may say, this is a minor feature, as affecting the topic under discussion, but nevertheless it is one of numerous things which has its place in a consideration of the question, and its importance in influencing people to get interested in cattle is an unknown quantity.

8. LEARN WHAT THE MARKET DEMANDS.

While the stock market is the place to learn what the market demands in certain directions, the agricultural fair is also the place to learn what the market calls for in other directions, especially in breeding stock. Here the observer sees what is nearest perfect in type of beef or dairy animal. Here he may learn what color, form, size and style is in greatest favor

among the breeds. What type of an udder is most demanded by the best informed breeders? A row of fine aged milk cows will show considerable variation in form of udder, but there will surely be one type much more in demand than others. There is the large, upstanding, inclined to coarseness beef animal, and the smaller, lower down, more refined beef animal in the same class. Current talk around the show ring and the awards of the judge will often show men that they are not growing the kind of stock the market demands. Here a telling lesson is taught them.

Since 1851 the Indiana State Board of Agriculture has had many thousands of pure-bred animals shown upon its fair grounds, millions of visitors from all over the State have viewed them, and many thousands of dollars have been distributed among exhibitors as rewards of merit. Who will pretend to say that these annual exhibitions have not greatly benefited the State? Certainly the argument is mainly in favor of the exhibition. As to how great the returns are to the State, who can say? Certainly no man can measure the benefits, but unquestionably they have been very great, and have more than repaid the State for the money expended in that direction.

REPORT OF COMMITTEE WHO PREPARED THE PROGRAM FOR NEXT MEETING.

Following is the program for the Twenty-fifth Annual Meeting of the Indiana Wool Growers' Association:

1. Address by President.
2. Report of officers, etc.
3. Greeting by the Governor.
4. Payment of dues and receiving new members.
5. "How to Judge Sheep," J. R. Tomlinson, Fairland, Ind.
6. Own Selection, by Professor Plumb, Purdue University.
7. "What Size Carcass and What Quality of Wool Should We Produce in Indiana and Make the Most Money?" Charles Roundtree, Yountsville, Ind.

MORNING SESSION.

8. "The Sheep for the General Farmer," Prof. Walter Quick, Brooklyn, Ind.
9. "The Conditions of Sheep Husbandry and Its Relations, and the Material Prosperity of the American People," J. M. Harshbarger, Ladoga, Ind.
10. "Should Every Farmer Raise Sheep?" "Sid." Conger, Flatrock, Ind.
11. "The Sheep of the Day," Prof. W. A. Bell, Indianapolis, Ind.
12. "Comparative Profits of Sheep and Cattle," Valvin Mathews, Brooklyn, Ind.
13. "Resolved, That the Indiana Sheep Breeders Should Breed First for Mutton and Second for Wool," I. C. Phelps, Greensboro, Ind.

14. "What Benefit Does the Average Farmer and Sheep Breeder Derive by Attending the Agricultural Fairs and Watching the Judging of Them," J. L. Thompson, Gas City, Ind.

15. Election of officers and unfinished business.

The following resolution was offered by W. J. Quick:

"Whereas, Other associations have proven by experiment that they have enlarged their field of usefulness by holding their meetings at a different place each year, and

"Whereas, This Association finds itself handicapped by the State Board meeting at the same time, be it

"Resolved, That this Association after the meeting of 1900 at the State House, hold the next four meetings in some other points in the State, again returning to Indianapolis in 1905, and

"Resolved, That a committee be appointed, known as a Location Committee, or the Executive Committee, take this matter in hand and select the location each year from recommendations made."

The motion was made and carried that the resolution be referred to the Executive Committee for action.

The following resolution was offered by W. J. Quick:

"Whereas, The advancement of the sheep industry in Indiana is being retarded by inadequate effort to suppress the terrible scab disease and prevent its spread, and

"Whereas, We have good federal laws on the subject with which our State is not fully co-operating, be it

"Resolved, That this, the Indiana Wool Growers' Association in session, appoint a committee to prepare a bill and memorialize our present Legislature for the compulsory dipping of all sheep that go to the Union Stock Yards, Indianapolis, for any other purpose than butchers."

Prof. W. J. Quick's resolution was adopted and a committee of three was appointed to wait upon the Legislature and have the resolution considered. The following committee was appointed: Prof. W. J. Quick, I. N. Cotton and C. A. Howland.

Reading of the following letter from W. A. Bell by the Secretary, Mr. Robe:

"Decatur, Ill., Dec. 27, 1898.

"Dear Sir—Again I am favored with program of your annual meeting. It would afford me great pleasure to attend, but I do not now see my way clear to do so. The subjects are well chosen and up to date in importance to sheep raisers."

"I should be pleased to read these addresses and the discussions delivered before your meeting. I am sure you are on bed rock and a rich treat will be enjoyed, as in times past. Somehow I always felt that you Indiana sheep men were an unusually live and broad-gauged lot of men, quite in contrast to the rule. Some of our sheep associations are awfully cranky

and one sided. There never has been a time when so much intelligence, liberality and enterprise were needed in the sheep business as right now.

Very cordially yours,

"R. M. BELL."

Officers elected for 1900: President, W. A. Guthrie; Vice-President, Sid Conger, Flat Rock; Secretary, J. W. Robe, Greencastle; Treasurer, John L. Thompson, Gas City, Ind.

It was moved and carried that the Secretary cast the entire vote for the Executive Committee of Wool Growers' Association: Howard Keim, Ladoga, Ind.; C. A. Howland, Howland Station, Ind.; W. A. Bell, Indianapolis.

Prof. Plumb made a motion that officers be elected when program is half through instead of at the close of the meeting.

Motion carried.

On motion the meeting adjourned.

SID CONGER,
Vice-President.

J. W. ROBE,
Secretary.

TWENTY-SECOND ANNUAL MEETING

OF THE

INDIANA SWINE BREEDERS.

The twenty-second annual meeting of Hoosier Swine Breeders goes down in history as the best and largest meeting ever held. The Swine Breeders had more present at their meeting than all the live stock meetings had together. When President E. M. C. Hobbs called the meeting to order in the Agricultural rooms at the State House there were from 300 to 400 present; the chairs were filled and standing room was at a premium. Besides the Indiana breeders, the sister States of Ohio, Kentucky and Illinois had representatives there. One breeder remarked that he never attended a better conducted nor more interesting meeting than this one. The indications are that in 1900 the Swine Breeders will do still better than they did this year, as it is the intention to give a grand banquet at the close of the different swine meetings. They expect to have from 200 to 300 breeders at their banquet, representing all the different breeds of swine.

After the President's address, which was well received, followed a long list of papers and discussions, but we will give the new officers and other business before the institute report.

Officers for 1899—J. B. Luyster, Franklin, Ind., President; H. C. Ollar, Russlerville, Ind., Vice-President; Allen G. Beeler, Liberty, Ind., Secretary; A. S. Gilmour, Greensburg, Ind., Treasurer.

Executive Committee—H. C. Ollar, W. A. Hart, A. S. Gilmour.

Program Committee—Allen G. Beeler, Joe Cunningham, E. K. Morris.

The following resolution was presented by W. A. Hart, and passed:

Resolved, That it is the sense of this Association that the premium lists of all agricultural associations should publish with their show lists the names of the judges in the different live stock departments, and that it is the further sense of the meeting that a committee of three be appointed to meet with the State Board of Agriculture in February. The following committee was appointed: Ad. F. May, Flat Rock; Joe Cunningham, Lorey, and J. B. Luyster, Franklin. The following is the President's address:

PRESIDENT'S ADDRESS.

To the Members of the Indiana Swine Breeders' Association:

It is with pleasure that I greet you to-day at this the twenty-second annual meeting of this Association. After a life of a score or two of years, this Association never met under more favorable circumstances. We have met here from year to year, and with the change of dates there has come changes in the faces of our members. Gray and snow-white locks have gathered around the faces of those who have so long been our guides. Some are gone, many more are here and among them I am proud to see the young men well represented in this meeting and I consider it the signs of life and vigor to the Association and bespeaks the future as still progressive. We need to progress, too, that we may keep pace with our sister industries and be ready for requirements of the future. The future of the farmer of our country never was more encouraging. The broad area of wild land has already been reclaimed and there is little unoccupied land to depend upon. Yet the population we are to feed is rapidly increasing, being already more than 75,000,000, and it is but a few more years until 100,000,000 will be reached, and all to be fed by the farmer. Yea, not only this but since our last annual meeting our nation has extended its benign influence to other quarters of the globe and millions of people will soon feel the presence of the Stars and Stripes. After this spreading out of our nation will follow the increased commerce of our people. Our ships will be fuller not only of the products of our factories but the products of our farms. The prestige our commerce will give us, will enable us to claim the markets of the world. The hog and the corn of our country will play no small part in this changing condition. In the future of swine breeding, the problems are growing not fewer but more numerous. The spirit of competition on all sides will bring us the accompanying problem to solve; the changing taste of the people and the demands of the markets will bring its problems. The necessity of getting all pounds possible out of food fed will still exist and the problems to solve in the future will be disease, insecticide and germicide will still be good fertile fields for the students of our business.

The future is bright for him who has the will. In our consideration to-day our topics are of a general nature and not with reference to any particular breed.

The first paper read was by H. Z. Churchill, of Elizabethtown, Ky., who is President of the Kentucky State Swine Breeders' Association, on the following subject:

OUTLOOK OF THE SWINE INDUSTRY SOUTH OF THE OHIO RIVER.

This is a subject that requires great care and especial thought and information, much more than I am capable of giving, so I fear in your President assigning me so important a theme, he has made a great mistake; but when he was in Louisville, I promised that as the Indiana Association had been so kind in helping the association of which I have the honor to be President, I would undertake, in my humble way, to discuss whatever he might assign me. The country south of the Ohio River embraces a vast expanse of territory, and to presume to tell of the swine outlook in all of that great area would require a great amount of traveling and inquiry, more than one could reasonably undertake. Having been, as the common term goes, a drummer, the greater part of the last eighteen years, and one with a very inquisitive turn of mind, traveling not only on the great even thoroughfares, but in buggies, wagons, etc., through all the by-ways, paths, country roads, etc., stopping with people of all professions and vocations. I have noted with pleasure the gradual advancement of the stock interest in this great country until now it has assumed a very rosy hue indeed. In 1880 there was practically nothing thought of or raised in the extreme States south of the Ohio but cotton, and well might they not, for then they were getting from ten to twelve cents per pound and raising from one to two bales of five hundred pounds each per acre. The farmers and planters had their corn cribs in the great corn States in the north and west, and their meat houses in the great packing cities of Chicago, Kansas City and Omaha. To talk stock was to be laughed at. Their ground was thought to be too valuable to think of planting corn, when forty bushels would be considered a good crop. From that time on things have been changing, the price of cotton has been going down and down and now it is a drug on the market at four cents a pound. By the constant planting of one crop, the earth has become improvident, and now with the most liberal use of fertilizers two-thirds of a bale to the acre is considered a good crop. These people had to turn to other modes of farming for a living or starve. To-day you can see corn fields all through the far south and bunches of stock on nearly every place. Further north, in Kentucky and Tennessee, the farmers have found that raising cattle and hogs to feed their corn to, is much more profitable than selling the grain, so they have now commenced sowing less small grain and raising more corn to feed stock. These are the conditions we now find among the planters and farmers south of the Ohio. And why should we not take advantage of them? When fortune and opportunity knocks at our door, why not respond and open quickly? One class is already seeing the advantages of this great find and are cultivating it very earnestly. This is the editors, for already agricultural and stock papers are being established

in many cities and towns in the south, which is not only an advantage to the people there but ours. Still now in many places throughout the south you will find the swine of the razor-back, sand digger, tamworth variety, fit for nothing but to train dogs to run, and not enough fat on their whole carcass to keep a person warm one day in the year. From personal observation, inquiries are coming in daily from almost every State, asking for prices on fine pedigreed hogs of all breeds, and not a few sales are being made. They all want good stock, and especially good males, to bring up their herds to good grade. What is true in my case, I hear, is true with others. Now, my friends of the Indiana Swine Breeders' Association, while we people in Kentucky have made wonderful strides in the swine industry, and intend to make greater ones, it was made largely by your assistance and advice. What you have helped us to do you can help others and do yourself. We few breeders south of the Ohio River can not supply all of this vast field, and even if we could the buyers there would not let us, for you know "distance lends enchantment." This field is great and growing; pitch in and cultivate it as you have never done before. The West is swarming with good breeders. Ohio, the original home of the Poland-China, is a strong competitor on the east. The south is new and becoming ripe for good stock; try to convince her that there is five dollars profit in good stock where there is only a chance for an even break in the poor, common kind. While this field is growing, these people demand and must have fair treatment. Some breeders seem to think that anything is good enough for "across the river," or else they do not know good stock themselves. At first these people may be ignorant of what is good, but they are very apt students indeed, and when they find out that they have been imposed upon, woe to the person and his stock who has played this confidence game; they had better remain at home in the future. In catering to this trade above all try as much as possible to teach them that cash is best, both for buyer and seller, as credit makes many persons liberal buyers and forgetful of pay day. Do not think of "boom prices," for we do not get them and we should not. Fair prices and good stock will always win. Above all, send stock that is worth the money, and if you have not got just what the customers want, don't send any; better miss a trade than have a person dissatisfied, for a dissatisfied customer is our worst enemy to the fine stock business. (he never ceases talking). Treat the trade well, sell and ship them good stock that is worth the money. Occasionally drop your old customer a line, asking him about his health and incidentally that of his herd. In these ways and others, if I had time, I could show you that the outlook of the swine industry south of the Ohio River is very bright indeed.

Mr. Neal, editor of the Farmers' Home Journal, being called on, said:

"In the cotton raising States of the south, there is a good demand for good hogs, on account of the low price of cotton. The planters are taking

great interest in hogs. They are finding out that they can raise a good hog cheaper than a common one; but you must not think that any kind of a hog will do for the planters in the cotton States. As to Kentucky, we have every facility for raising hogs, have the climate, water and grass, and we can raise hogs cheaper in Kentucky than you can in Indiana."

The second paper was read by J. B. Luyster, Franklin, Ind., on

**"HAVE YOU OBSERVED ANY IMPROVEMENT IN THE FARMER'S
HOG IN THE PAST YEAR?"**

Yes! There are several reasons why they have improved. The once a year of fattening and selling is of the past. At this day and age, when the farmers can sell a fat hog any day of the year, compels him to look for a profit. When to get this profit compels him to look for the improved blood in order to fatten and mature the animals with less age. That which will return to him more pounds of meat and lard with the least amount of good feed.

Farmers are learning that economical feeding is a source of revenue. I do not mean by this that they stint their hogs. But they are learning more every year, how to prepare the feed to get the best results. The farmer who to-day will stand among his hogs at feeding time and watch them eat is the man who succeeds with hogs. The second reason why they have improved is competition. Farming of to-day is a profession. I can remember when the farmer who had no debts, a little money, was satisfied. Not so of to-day. He sits by the fire of winter evenings reading and thinking. He gets every day's market reports and how Mr. S. or Mr. M. had sold so many hogs at such and such prices, on account of their fine shape and evenness. The hogs might have been Berkshires, Chesters, Durocs or Polands. No matter as to breed, but the result of the good sales was good blood. It puts him to thinking, and from those thoughts come improvement in his hogs, by purchasing a well-bred male and a few sows.

The farmers as a rule are hot competitors. The good ones watch one another as hawks would a mouse, and the second-class try to imitate them. Thus competition compels them to improve their hogs.

The third reason is pride. The good farmer prides himself on his ability to breed and raise as good hogs for market as anyone. To have a shipper offer one farmer ten cents more on the hundred for a bunch of hogs, because they appear more even, comes from the improvement of the farmer's hog. This touches the pride of his next neighbor, who will in all probability be over to Mr. L. in a few days after a good Chester White male; going home with him he passes his neighbor to show him he will be in the swim next year. Or perhaps his temper got the best of him, and while red-headed, rushed over to M's and bought a Duroc red.

The fourth reason why the farmer's hog has improved in the past five years more than before in forty is because the packing houses instruct their buyers to purchase good ones. The rough and unsightly hogs selling with a dock, the shipper having to stand the dock, goes back at the farmer with the same. Consequently, the farmer tries harder every year to avoid the rough and mean ones in his herd. Again, our State and county fairs are responsible to a great extent for the improvement of farmer hogs. I have noticed of late years that on show day at fairs there is always a good crowd of farmers, and they are becoming better buyers every year at fairs. And when Brother B. of R. can not talk a farmer into purchasing one of their good Berks., no one else need apply. Yet, after all, when you come to sum up the cause, from start to finish, of improvement in farmers' hogs, it is just the untiring efforts of the breeders of pure-bred animals of all breeds; second, observation of farmers from results of using pure-bred animals.

The improvement of farmers' hogs is spreading over this great country like the little wave from the pebble thrown into the pond; at first 'tis only a small circle, but as it spreads it gets greater and greater.

I read an article written by F. H. Work on "The Hog of the Future." He seems to think we swine breeders have departed from the razor-back of fifty years ago to our detriment. But from an unprejudiced standpoint I can not agree with him. He says we can best advance by going backward until we find the happy medium between the over-burdened weakling of to-day and the lank hog of pioneer times. The many wise changes in sight tell us of a happy change in condition, and foretell that as a consequence the farmers of the United States will give to the consumers a better class of bacon.

I have a neighbor farmer who tried this very thing. He had a car load of hogs wearing belts; he fed them until he became disgusted and sold them. His hired man made so much fun of his hogs that he came to a sale at which I was auctioneer and was the best purchaser I had. He bought all the old and young sows. To-day he has good hogs that are turning him a profit from his care and feed.

Line up, brother breeders, and push your work harder for next year.

If you favor a certain breed, stay with it; that is the only way to make a success out of it. If you like the Poland-Chinas, stay with them. But you must take off some of that jowl so he can hold his head up. You Poland-China men are improving your breed, but the bacon hog is coming after you. I can make as many pounds with the Thin Rinds as any other breeds on same feed. I made a shipment a few days ago of three head that weighed 158 pounds at 153 days.

I think the bacon hog is coming. While in Germany I found a breed there they called "Westphalia Hogs." They were white and similar to a large Yorkshire. I found the pork in Germany superior to ours in

taste; it was made so by their careful feeding, and feeding a variety of food. You are aware that they do not feed corn there.

Lucien Arbuckel, Hope, Ind., then read a paper on

HOW CAN WE IMPROVE OUR JUDGING OF SWINE AT THE FAIRS?

The subject assigned to me is one that has been before the swine breeders of the United States for years, and it has been discussed by breeders until we have advanced from the old way of judging by a committee of three to the single expert judge system of to-day. When the judging was done by a committee of three, often men were put on for judges that could not tell a Berkshire from a Poland-China, and I almost believe they could not distinguish a Duroc from a Chester White. And I am sorry to say that I have seen men who claimed to be experts who, by their work, showed almost as much ignorance. They either did not know or were tying the ribbons on the men instead of the hogs. But to return to my subject, "How Can We Improve Our Judging?" I would say, let the different fair associations and the managers of our great swine shows select only men who they know are competent judges, men who are breeders of thoroughbred swine and men that will show no partiality among the exhibitors. When a judge goes into the show ring he should forget for the time that he ever knew any of the exhibitors; he should give every animal shown a thorough examination and tie the ribbons where he honestly thinks they belong, and as a result nine times out of every ten he will give satisfaction. While the judge can not please everyone, he can do his work in such a way that the men whose animals are defeated will be as nearly satisfied as it is possible for them to be. The exhibitors can help to improve our judging by bringing their animals into the show ring in the best shape possible, and by not getting into the belief that their herd is the best on earth. When they see that the judge is doing his work to the best of his ability, even though they do not agree with him, they should remember that we all do not see alike and that every man has his own particular ideas about swine. I firmly believe that, where the swine show is large enough to justify it, the management should secure an expert for each of the four leading breeds of swine, or, in other words, a Poland-China breeder to judge Poland-Chinas, a Berkshire breeder to judge Berkshires, a Duroc breeder to judge Durcos and a Chester White breeder to judge Chester Whites. This is possible in shows such as we have at the Ohio, Indiana and Illinois State fairs, for I believe that no man who is a breeder of Poland-Chinas makes the study of the other breeds he should in order to become a competent judge of them. The same is true of the breeders of Berkshires, Chester Whites and

Durocs. In small shows, such as we generally see at our county fairs, it is not possible to secure an expert for each breed of swine, but right here the fair associations can help to improve the judging at our fairs and save the judge many unjust criticisms, by giving each breed a class; then they will not only make judging easier but make larger and more interesting shows. Now, brother breeders, I am here not only to give you my ideas of how we can improve our judging, but I am here to learn, and I hope in the discussion this paper brings out to learn more about how we can improve our judging at the fairs.

A long discussion on judging at the fairs followed this paper, and the outcome of it was the resolution passed in regard to having the names of the judges printed in the premium list; also a committee of three appointed to meet with the State Board of Agriculture.

Next on the program was a talk from Mr. C. C. Lillie, of the Armour Packing Company, of Chicago, on "The Desirable Hog from a Packer's View." His talk was one of the most interesting before the swine breeders. He displayed three large charts from which he explained the value of the different feeds.

He said that the packers wanted the hog the people wanted, that they wanted more lean and less fat. He further said, it was not in the breed but it was in the feed. If a breed is fed carefully for generations, it will come nearer being a bacon hog than a corn-fed hog. What we want is a streak of lean and a streak of fat. The size demanded by the packers is from 170 to 250 pounds. You can get as good a bacon hog in a 250-pound hog as you can in a 170-pound one. It is in the feed, and a 250-pound hog can have a streak of fat and a streak of lean as well as a 170-pound one. Color does not cut any figure with the packer, for he wants a long-bodied hog, well hammed with good shoulders, and the sooner you get him to weigh from 170 to 250 pounds the better. Get him on the market as quickly as you can. Feed has great influence on animals, for our swine breeders can take a hog and by his selections and different feeds can mould the hog to suit his fancy, as the sculptor does with his clay, and in this way he can produce more lean meat. You can not produce a bacon hog on corn alone; you can fatten pigs on corn, but you can not grow them. What you want is a balance ration. Corn only plays a small part in the feeds, as milk, wheat and tankage are the strongest feeds. Tankage is the offal of the pork packer, such as the scraps of meat, blood, etc. He said the sooner the farmer gets his hogs to weigh 170 to 250 pounds the better, but the trouble with many is that they prolong the fattening period. He should be fattened as much as he ought to be while he is growing. There is no money in hogs to keep them a year and then start to fatten them. The balance ration is what you want to study, that is what will produce

your bacon hog, and the sooner you get this kind of a hog the sooner you will get better manhood and womanhood than by eating clear fat.

Question: What is tankage?

Answer: It consists of meat, blood and lungs, is cooked five to six hours under twenty-five-pound pressure of steam, and there is no danger of disease germs.

Mr. Lillie was followed on the same subject by Henry Speers, of Kingan & Co., Indianapolis, Ind. The following is the paper read by him:

THE AMERICAN HOG.

You have asked me to say something in regard to the American hog from the standpoint of a pork packer. I think it reasonable to anticipate that our idea of the hog most suitable for a packer whose product finds its way into the European markets may not be in harmony with that of the hog raisers of this country. Generally speaking, the pork meats that command the highest price are made from hogs that show an evenness of fat from shoulder to ham, down the back, and a greater percentage of lean than most American hogs have. This evenness of fat and leanness are attributed to the breed and to the kind of food the pig is raised on. The feeding has a great deal to do, both with the flavor and leanness of the hog. It is well known that hogs fed on boiled potatoes, crushed oats, corn, ground peas, etc., will have much leaner and better flavored meat than those fed almost exclusively on the raw, uncooked corn, which is usual in the United States. It is found that when the ham cut long for the English market is hung up and dried for a considerable time without being smoked, that the fat will separate in layers at the end, the oil oozing out from the fissures, and the fat becomes more or less yellow. This is attributed to the oily nature of the corn feed. Such conditions are hardly ever found in hogs raised in England, Ireland or Denmark, on account of the mixed feeding and the cooking of the food. I might also say that hog cholera is not nearly so prevalent in the countries mentioned. I know of two large breeders in England who have always on hand from two to four hundred hogs in their piggeries and who have not lost a hog through disease in two years. I am trying to put before you the quality of the meat which will bring the best price in the English market, which is the largest consumer of the pork product of this country, but I think that I might bring this matter of fatness nearer home. The consumers in the large cities of this country are as anxious to get lean hams and streaky bacon as anyone else. In the country districts, of course, there is a demand for heavier meats, because it generally sells at lower figures and the habits and tastes of the people are different from those living in cities. Lard for several years has not commanded the price that it did formerly in ratio to the meat, as other products, such as cottonseed oil, etc., have come into competition with it. In the large packing

houses, the hams from hogs weighing 250 pounds and up are so fat that the packers now find it necessary, in order to be able to sell them, to strip the fat from the back of the ham, leaving only a layer of fat about a quarter of an inch in thickness. These are known to the trade as block hams. This cutting of fat from hams and shoulders very much increases from what it used to be the amount of lard which a hog produces, and the increased production means a lower price. I doubt not that most of the gentlemen here present, if they were purchasing a ham or piece of breakfast bacon would buy lean meat, because they know from the kitchen department that it is more economical; much of the fat is unconsumed and finds its way into the grease barrel. In the large manufacturing cities of Great Britain, where much of our product is consumed, the people lead an indoor life, confined to large workshops and factories, and it is well known to you all that the tastes of such people are not in common with those who lead an outdoor life. These are the people who have to be pleased and who are willing to pay for what does please them, and I might say that these are the people we must please if we are to stay in the business. It is utterly useless for our American hog raiser to say that the corn-fed, large, fat hog is the best. You may have your opinion, but the consumer who buys the meat is going to be his own judge, and I know that he unquestionably prefers leanness to fatness. It is the buyer who must be pleased if we are to get the highest price for our pork products. I presume that a good many farmers will say that it would be almost impossible to raise these lean hogs on a profitable basis in this country. They themselves are the best judges of that. I am attempting, as nearly as my experience and knowledge go, to give you the facts in the case. I think it is worth the consideration and careful thought of the American farmer to look around him and see what his neighbor, the Canadian farmer, is doing in the line of hog raising. The exports of Canadian hog products during the past ten years show an enormous increase. This speaks volumes for the breeding of the Canadian hog, the manner of feeding and the all-around superior quality of Canadian pork, which commands and maintains a higher price than ours, notwithstanding their ever-increasing export business. The Canadian government is untiring in its efforts to educate the farmers on the necessity of retaining their supremacy, as far as quality is concerned, over the hogs raised in the United States. Their agricultural colleges are educating their young farmers as to the best ways of raising and feeding hogs, and competent judges of hogs travel over the country, whose business is to look after this particular interest. You are doubtless aware that corn is not extensively raised in Canada except in Western Ontario. Canadian farmers in general feed their pigs potatoes, barley, oats, peas and roots of all kinds, with a moderate amount of corn. In that portion of Canada where corn is raised, the hogs from that section are classed as undesirable by

the packers engaged in the export trade, and their price is about on a par with the American hog. But the long, lean hogs always sell at a premium over the short, fat, corn-fed animals.

Question: Why are the long, lean hogs docked?

Speers: At what weight?

Answer: At from 150 to 170 pounds.

Speers: I have been in the yards for years and if that class of hogs are healthy and good ones, they are not docked.

Quick: It seems to be a fact that they do dock the long, lean hogs at our stock yards. I would like to ask if buyers can tell us, when they see a load of hogs, if they have a streak of lean and a streak of fat. As long as the highest price is paid for fat hogs then we will continue to raise the fat hog. In Germany they have no corn, but feed cooked or steamed food, consisting of sugar beets, potatoes and barley. Their hogs fatten rapidly and that means more lean. If buyers at our yards continue to pay the highest price for fat hogs the bacon hog will not come, but if they begin to pay more for the bacon hog, then the farmers will breed and feed for this style of hog.

Lillie: I do not know of any light-weight hogs being thrown out, unless they were in poor condition and old. As to buyers telling by looking at a hog if it is a bacon hog, they are fast learning to tell them, for you can have a fat hog and still have a bacon hog.

Martindale: Take pork quotations and you will see light-weights quoted ten cents lower than heavy weights. These tables show tankage to be the best food, that is all right for Armour & Co., for they want to sell tankage to the farmers. If these packers can get a lot of "soft heads" together and raise a hog that they can buy for ten cents less on the hundred pounds they will try hard to do it, for that will make them money.

Lillie: We only show in the tables the value of tankage; you do not have to use it, but it is a substitute for milk. A balanced ration is cheaper than an unbalanced ration, and the day is coming when people will practice it, for the men that are making money out of the business now are the ones that are paying attention to this feed question.

Dr. Hendricks: This balance ration is nothing new to the breeders of pure-bred swine; we have been experimenting and practicing it for years.

Work: I am a firm believer in balanced rations; I practice it and know it is the right way to feed.

The next paper was on what the Association had been discussing, "Balanced Rations for Swine," by E. H. Collins, Carmel, Ind.

BALANCED FEEDING RATIONS.

The principal improvement in the breeds of hogs lies in the capacity for digestion and assimilation of food. If the wild boar could be miraculously furnished with the improved digestion of pedigreed stock, nature would find a place to pile up the fat on his rugged frame. He might not be a beauty, but he would make weight and lard. And he would quit jumping over the moon for pastime. We have, therefore, taken one very strong advanced step forward in improving the machine for extracting meat from corn and grasses. Have we kept pace with this improvement in digestion in our study of adaptation of foods? The older members well know the principle of a balanced ration. I may state for younger growers that the elements in food which furnish muscle should be in proportion to those elements that produce fat, as about one to six. One of muscle forming foods to six of fat forming. This ratio changes from one to five in quite young growing animals and from one to eight in mature fattening animals. The reason so much more carbonaceous elements are needed than albuminoid, is that they form the fat which furnishes all the fuel to warm the body and all the force to move it. Every action of every muscle, even the expanding of the lungs and the pulsation of the heart, calls for so many units of force, which must come from the burning of fats. This calls for warm shelter, as lumber and wind breaks are cheaper than burning fat at one to ten cents a pound. There is one principle which I think the untrained feeder violates more readily than others. It is the fact that an animal cannot appropriate the carbohydrates to make muscle; and, therefore, if the muscle food and bone food is short, much of the fat-forming food must go off with the excrements. In building a brick wall if one gets short of mortar he may use it a little more sparingly and make a weaker wall. Or he may pile up a few loose brick without any mortar, but he will speedily come to the time when the brick will be worthless for use of construction. This is true of every feeder who furnishes too much carbohydrates. He does not know that there is passing off with the excrements a lot of costly food material that would, if saved, buy the food necessary for a balanced ration and also improve the health and growth of the animal. I have seen paths where hogs passed in winter strewn an inch deep with grains of undigested wheat. If one could see the fat-producing elements in excrements that have been digested, but not assimilated, because not needed, as he can see that wasted wheat, he would wake up to his loss and change his feeding. Prof. Henry does not think bran good for young hogs, and it is far better to balance corn with clover pasture in summer and with skim milk or chopped and scalded clover hay or flaxseed meal in winter. Prof. Henry quotes Prof. Stewart's experiment where he fed pigs averaging seventy-five

pounds each, with corn meal, two quarts of short-cut clover hay being added to each day's allowance, and the whole wet with hot water and allowed to stand ten to twelve hours before feeding. Another lot received meal in the same way without the cut clover. The lot getting clover hay showed the best appetite, the greatest thrift, and made the steadiest gains. The pigs getting meal gained 110 pounds each in 120 days. While those having the cut-clover hay with their meal gained 143 pounds or 30 per cent. more. Skim milk, of course, is good to balance corn. Ford's experiments show six pounds of it to be equal to one of grain. As to sour milk, I was surprised to see Cooke's statement that those pigs having sour milk ate with a better relish, looked sleeker and grew faster. I was also surprised that the Massachusetts station shows that buttermilk gave as good returns as skim milk. And that Ontario College shows that eight pounds of whey equals one pound of grain. In balancing corn with pasture Prof. Henry quotes from the Illinois station that there is a gain of 30 per cent. when one-half feed of corn was given on pasture over feeding corn in a pen. But it was a little surprise to note that only 20 per cent. gain was realized when a full feed of corn, instead of a half feed, was given on pasture. This is especially true during the first half of a hog's life. We have all been praising the practice of allowing hogs to follow grain-fed cattle. Professor Morrow states that when pigs following steers were finished off they gained 3.2 pounds daily and returned as much as 16.8 pounds per bushel of corn. This certainly sustains our belief that it is good practice to let hogs follow grain-fed cattle. The partly-digested hay or grass dilutes the grain and distends the hog's digestive tract, and the practice is a clear gain, since the grain passed by the cattle would have been a total loss. It is not advisable for the average farmer to buy costly feeds to balance corn for market hogs. But he can afford to provide a clover pasture and to furnish his hogs plenty of ashes and charcoal, and give his spare milk and the by-products of the dairy to the pigs. He can also, at trifling expense, give each 100-pound hog a handful of linseed meal a day; this would increase the appetite and give a sleek coat and a thrifty growth. Although I have never tried chopped clover hay soaked in hot mash, I believe it would be an inexpensive, coarse nitrogenous food to give with grain winter months. Permit me to say that cotton-seed meal is not a good food for hogs, although excellent for cattle. Also, that flaxseed meal may be given as freely as the cost of it will permit after stock become accustomed to it. Cattle have been fed gradually up twelve pounds a day of linseed meal with good results. I notice our best authorities, while approving warmly a so-called balanced ration, are much opposed to feeding bran to hogs. Professor Henry quotes from the Maine station a table showing that with the same allowance of feed middlings proved twice as valuable as bran. This is especially true with young hogs and with pigs that most

need nitrogenous food to balance corn. Alabama station reports cow peas and corn as practically equal for producing gain. But that a feed composed equal parts corn and cow peas made an increase over either by itself of about 16 per cent. I can hardly close this hastily-written paper without giving an experiment in cattle feeding by the Kansas station. In three trials one lot of steers were fed a balanced ration of corn meal, oil meal, bran and shorts, against another lot fed corn alone. Both lots had fodder and hay.

Pounds-Average.

The balanced ration in the first lot gained.....	436
Against corn, which gained	284
A gain of	152
 The balanced ration in the second lot gained.....	 309
Against corn, which gained	274
A gain of	35
 The balanced ration in the third lot gained.....	 406
Against corn, which gained	203
A gain of	176

In these three trials, in each of which five steers were fed, an average of five months, it took 1,271 pounds of corn to produce 100 pounds of gain. But it required only 905 pounds of mixed feed to give 100 pounds of gain.

All such experiments by our faithful students of the knotty problems of feeds and feeding show us that a man's success as a feeder does not depend on the size of his crib, or the length of his pedigree, alone, but also on his tact and common sense in the judicious compounding of foods. As I write I see a load of clover hay going to market. It will bring about \$5 a ton, and is worth \$8 for its fertility and something for its humus, besides being worth \$5 to feed. If fed to stock to balance corn it will return 85 per cent. of its plant food in the manure. All the animal food this hay contains is absolutely worthless as a fertilizer. If you plow it under or sell a few tons of clover you lose the animal food it contains. Suppose you feed it to dairy cows and secure a ton of butter. That butter would have been worthless if plowed under. But is worth \$500 for human food. The same rule holds good in feeding clover to hogs or stock.

Following Mr. Collins, came a paper that was in the line and thought of the talk by Mr. Lillie and Mr. Collins's paper. It was read by Mr. Crawford, Columbus Grove, O.:

THE PHYSICAL MAKE UP OF A HOG FOR PROFIT.

Mr. President and Gentlemen of the Indiana Swine Breeders' Association:

While I very much appreciate the honor of being on the program of this meeting, I feel my inability to do justice to the part assigned me. The physical make up of a hog for profit depends, to some extent, on whether he will bring the most money in lard or in pork. Years ago he was the most profitable in lard. To-day he is the most profitable for meat, shoulders. I can not see where it is profitable to raise a hog for bacon. This being the case, we want a hog that has a greater proportion of muscle and not so much fat. I do not mean strictly bacon hog, nor do I mean a long-legged, long-nosed, pot-gutted hog that has inferior hams and shoulders. I can not see where it is profitable to raise a hog for bacon and not having hams to correspond. Much of late has been said about bacon hogs, but we must not lose sight of the fact that while we need good bacon we also need good hams and shoulders. It seems to me that the hog for profit should have a good length, a small, neat, well-formed head, not too heavy a jaw, large lungs, good back, heavy loin, large, deep and well-developed hams and shoulders, short legs, and stand well on his feet and small insides. If you have this kind of hog, no matter what breed he may be, he will find a ready sale at top prices. This type of a hog will grow pounds faster, make a finer quality of meat and weigh heavier to his look than any other type of hog I know of. This kind of a hog feeds well and makes a profitable hog to raise. I can see no profit in raising big-headed, slab-sided, raw-boned, small-hammed hogs; for they make flabby and coarse-grained meat and are not desirable in any market. Breeders must breed the kind of hog that the trade demands, and farmers must not feed their hogs to become too fat. They must govern the fattening of their hogs to correspond with the wants of the grade. We want a hog that has a large muscle, quick grower and not inclined to grow too much fat. This kind of hog is bound to take the lead in our markets and consequently will be the hog to raise for profit.

Cunningham: We are to represent our business as breeders in raising and maintaining hogs, but if we listen to all the theory that has come up to-day and practice same, we would go crazy. I have not had it explained why light hogs are cheaper than heavy weights; if there are too many fat hogs, the light-weights will bring the best prices. I can grow a hog on corn and he will be as good as any hog fed on balanced rations. Mr. Lillie, tell us what price you can get for hogs in Canada. We cannot afford to feed as they do there, and we can sell for less money and still make more money on our hogs than they do. We feed corn, rye, wheat, grass and other feeds; it looks like that ought to make good enough meat for anybody.

Mace: I would suggest that breeders try this balanced ration feeding. Keep a record of same and report to this Association at our annual meeting in 1900.

The paper on "Parasites of Swine" was read by Prof. R. A. Craig, of Purdue University:

SOME OF THE COMMON PARASITES OF SWINE.

Parasitism is of importance, because all of our domestic animals act as hosts for some of the many different forms of parasites. This partnership formed by the parasite and its host is an unfair one, the parasite doing nothing, or but very little, for its own support. In a large number of cases this results in no perceptible harm to the host, but in many instances it causes unthriftiness and finally results in death. Probably swine act as hosts for a larger number of parasites than any of our other domestic animals; round worms, thorn-headed worms and external parasites being the most common. This fact is readily explained by the conditions under which swine are kept, their surroundings, food, water and care. Although swine are infested with a large number of parasites, they do not show as marked symptoms of parasitism as some of the other domestic animals. This is partially due to a hog's large appetite and his being able to make such good use of what he eats. If a hog is well cared for and well fed, he may be host for a number of parasites and still we can detect no interference with his thriftiness. If, for any reason, either from poor care or disease, he becomes unthrifty—and especially is this true of young pigs—he is then less able to resist invasion, and the parasites, if then present, will multiply rapidly. The injury caused by their presence varies and depends on the organ invaded, habits of life of the parasite, and the number in which they are present. The hog louse is the only external parasite usually found on swine. Pigs are more commonly infested with it than the mature animals. This is the largest louse found on domestic animals, and is said to produce a pruritus in proportion to its size. It causes severe irritation by pricking the skin with its mouth parts and feasting on the blood and humors exuded as a result of the pricking. A pig infested with this parasite is restless and unthrifty. Urticaria very often occurs along with the hog louse, and in these instances is probably due to the bites of this insect. The lung worm is one of the most common, if not the most common, parasite of swine. It is usually found in the smaller bronchial tubes and seldom causes such grave functional disorders as is caused by the lung worms of sheep and calves. The symptoms caused by this parasite are difficult breathing, troublesome coughing fits, that come on as soon as the pig starts moving about, unthriftiness, and interference with growth; generally with the development of the pig, his condition gradually improves. In some cases the lesions in the lungs are sufficient to cause death. Worms are not generally found in the stomachs of swine. Although there are a few varieties that live in this part of the alimentary tract, they are not often found in the swine in the country. We sometimes find the large round worms in the stomach, but the media here is death to this para-

site, and it is often found in a partially digested condition. The two kinds of parasites most commonly found in the small intestines are the large round worm, *ascaris suilla*, and the thorn-headed worm, *echinorhynchus gigas*. The large, round worm is a more common parasite than the thorn-headed worm, and is present in great numbers. It is not uncommon to find a double handful of them in the small intestines of one hog, while we rarely find more than ten or twelve thorn-headed ones. When a number of large, round worms are present in the small intestines, the course of the food is hindered and obstructed; digestion is disturbed and the appetite altered. In pigs there is marked unthriftiness. The only reliable means of diagnosis is the presence of the worm in the excrement. The thorn-headed worm causes more serious symptoms and the disturbances in nutrition are more marked. It attaches itself to the walls of the intestines by means of hooks, and causes considerable irritation. At the point of attachment the walls are inflamed and thickened. The inflamed thickened tissue is circular in outline, about a quarter of an inch in diameter, and deeply pitted in its center, where the head parts carrying the hooks, are imbedded. The symptoms caused by this worm are as follows: Poor appetite, great restlessness, indigestion, constipation, and in young and badly infected pigs, epileptiform spasms, and sometimes death. The whip worm, *trichocephalus crenatus*, and the pin worm, *oesophagostoma dentatum*, are the two common parasites of the large intestines. The pin worm is the more common parasite of the two, and about the same number of swine are infested with it as with the large, round worm. The two parasites of the large intestines are much smaller than those found in the small intestines, and are present in greater numbers, but it is not thought that they are harmful. When present in great numbers, or in union with other parasites, they may interfere with nutrition. The kidney worm, *stephanurus dentatus*, is met with in and around the different organs lying in the abdominal cavity. It is generally found in the fatty tissue around these organs, and in the canals leading from them to the bladder. When eight or nine of these worms are present in and around the kidneys, the inflammation is usually quite marked. The fatty tissue is firmer and darker in color than normal, the walls of the canals much thickened and inflamed, and occasionally one of them contains a large abscess. I do not know whether these abscesses are due to the kidney worm or not. It is not a very common parasite. The treatment for these different parasitic affections of swine is both preventive and medicinal, the preventive measures are very important. The herd should be properly cared for and its surroundings be as clean and healthy as possible. A pasture well drained and free from ponds is to be preferred. Drinking water from a good well and a clean trough is better than from stagnant pools and streams. Clean pens, pig houses and feed-

ing floors are important preventive measures. Unsanitary conditions will prove a continual source of infection. Unless proper methods are used it is difficult to rid a herd of swine of lice. Fluid preparations are more satisfactory remedies than powders or ointments. To be effectual, these medicinal agents must be applied in a thorough manner. A decoction made by boiling for half an hour two ounces of stavesacre seed in one quart of water, and applied to the surface of the skin with a brush or a sprinkling can, is a common remedy. Preparations containing some of the different tar products are much used, harmless and effective remedies. Zenoleum is used by the American Farm Company on their ranch, near Morocco, Ind. One gallon of Zenoleum is mixed with fifty gallons of water and the swine dipped into the solution. In order to kill the parasites hatched from the eggs which have resisted the first application, it is well after five or eight days have elapsed, to make a second application. The pig houses and sleeping quarters should be thoroughly cleaned and disinfected. Unless this is done, they will prove a continual source of infection. The remedies for intestinal parasites are best given in the slop. Turpentine is one of the best remedies, and the most widely used. It is generally given in milk, allowing one or two teaspoonfuls of turpentine for each pig. This can be followed by a cathartic of epsom salts, from one to three ounces, given in slop. Santonine and calomel are very effective remedies when used together. The dose for an eighty-pound pig is about five grains of santonine and six grains of calomel. One dose every day for three days is given in the slop. If a large number of pigs are to be treated it is best to divide the herd into several lots of ten or twelve pigs each.

Professor Bitting: Common soap suds fed to hogs, you will find good for worms.

Mugg: I feed oil of turpentine to my pigs for worms, and the result was good.

Bitting: Don't give a sow in pig any turpentine. We find that many of the cholera cures are worm remedies.

ANNUAL CONVENTION

OF THE

Indiana Shorthorn Cattle Breeders' Association.

RESOLUTION ON THE DEATH OF EX-GOVERNOR MATTHEWS.

Whereas, Since our last meeting the Shorthorn Breeders of the State, with feelings of regret and great sorrow, miss from their midst, as a wise counsellor, an honorable citizen and a tried and true friend, the Hon. Claude Matthews; and,

Whereas, In the death of our co-worker, the Shorthorn breeders of the State have lost an upright and honorable man, and the farmers of the State a man whose example is worthy of emulation by all the citizens of the State:

Resolved, That we tender to the bereaved wife and family our sincere sympathy in this, their great sorrow, and the Secretary of this Association is requested to send a copy of this resolution to the bereaved family.

ROBT. MITCHELL,
E. S. FOLSOM,
W. J. QUICK,
Committee.

The first session convened at 2 p. m., January 2, 1899.

In the absence of the President, James D. Williams, Mr. E. S. Folsom presided.

In speaking on the subject of "Price," which had been assigned him on the program, Mr. Folsom said:

Prices have usually gone up and down in decades. If we look back about fifty years we find that in every period of about ten years the price of Shorthorns has advanced and then depreciated. Now, there are reasons for that, and had I time to go over the records, we might have arrived at some facts and obtained some data for the future.

The prices had reached a high point in 1870, and the maximum was

reached at the great New York Mills sale, in September, 1873. Those prices were probably affected by the law of supply and demand, as the prices of all commodities are, but there had been previous to that higher prices. I think Mr. Cockran had sold two or three bulls for higher prices than were obtained at the New York Mills sale. I am not sure that the Second Duke of Hillhurst was not sold before that for twelve thousand dollars. That strain was in demand for bulls to head herds. Mr. Campbell sold his whole herd, and then came the great boom sale of 1873.

Supply and demand cut some figure in that; perhaps a great deal of the values were fictitious, because the purchasers of these animals never realized from them the worth of their money, but there were very few of that class of cattle in the country.

Following 1873, the plainer families advanced, stimulated by this sale, and all Shorthorns advanced for four or five years. In 1874 General Meredith made a sale at about \$1,500 a head. Soon after that cattle began to go down, and continued going down until the early years of the '80's, perhaps 1883-'84, and then they started on the up-grade, and kept on the up-grade through the '80's until very nearly the '90's, and about 1892 or 1893 went down to the lowest point. I think prices were lowest in 1892-'93. Since that time they have been advancing.

There are reasons in all these cases why prices have fluctuated. The depreciation in the price of Shorthorns was no greater than the depreciation in the price of other breeds of cattle during these years. That came about, in great part, doubtless, by the breaking up of the ranching in the West and the dumping of the cattle on the market, until it became so a calf was hardly worth raising. If you kept a calf two years the feed necessary to keep him was worth more than the calf. The calves went to the slaughter and the dams went to the feed lots, and perhaps two-thirds of the thoroughbred herds were dispersed in this manner. Perhaps a few of the choice ones were kept, but nearly all were distributed and went to the feed lots and to the slaughter.

Now, we are confronted with the up-grade condition again. We are wondering why cattle have advanced so rapidly in the last two years. The reports from the Bureau of Animal Industry, at Washington, are that beef cattle have been growing less in the United States at the rate of two million head a year, brought about from the conditions just spoken of. Prices ruled so low that the calves went to the slaughter and the dams to the feed lot, and the herds were dispersed. While prices are advancing, they are advancing, doubtless, from a shortage of cattle in the country. We have awakened to the fact that there is a shortage that cannot be made good in less than six or eight years. We can see some reason, then, why prices should be maintained, and we who have breeding cattle that are laying the foundation for the beef market ought to get better prices than we are getting for our male calves. The question of the price of females is not disturbing us, from the fact that there are so

few who have any to dispose of; but every breeder has more males than he has any use for, and the point is to distribute those and put them in the hands of those who desire them and need them. We might ask ourselves whether we are getting such a price as we could get. I could not expect to sell a male calf for \$100 or \$150 when my friend, Mr. Thompson, three miles away from me, will sell as good a calf for \$50 or \$75.

I will illustrate my case. In the early spring a gentleman wrote to me inquiring if I had any bull calves for sale, and, if so, at what price I would sell them. Doubtless he wrote to many other breeders. In replying, I told him that I had bull calves for sale and doubtless could suit him. I did not name a price, but assured him that if he would come and look I would sell him a calf worth the money. He visited me, and I took him out to the farm. He asked the price of the calves and seemed to be well satisfied with the price I named. He did not buy, but seemed sufficiently interested to learn the cost of shipping, the time to ship and all the details connected therewith. He took his departure, saying that he had been in communication with other breeders and would visit them, and if he did not find anything to suit him in their herds he would order a calf from my herd. I heard no more from him until I wrote him about three months after, and called his attention to the fact that he had visited my place, and asked him if he had secured such a calf as would fill his bill. He wrote and informed me that he had, and at just half the price I had asked.

Now, gentlemen, I assume that the breeder in that case either wronged himself, or the buyer was wronged, or both. He may have wronged himself by selling his calf for less than its value; he may have wronged the buyer by selling him that which he ought not to have had. If the calf was a typical Shorthorn, and such a calf as the buyer should have had for the purpose he wanted it, it was certainly worth more money, and, if it was worth no more money, the breeder should never have sold it for a bull; it should have been sold for a steer. If the calf was only worth \$50, then the buyer was wrong, for he bought something which he ought not to have put among his herd to build it up. He should have selected the strongest concentrated blood that could be found. Now I am not assuming that the calf was not a good one, but I am assuming that the man that sold and bred the calf did not get what he ought to have had. It is my opinion that no calf ought to be sold as a bull for less than one hundred dollars; he should be sold as a steer. I cannot expect to sell my calves, and you cannot sell yours, so long as your neighbor will put such a price upon his. Now, why is it not better for the Shorthorn breeders to stand closely together, put some price on their stock and sell it at its value, so that when the purchaser buys he will get the worth of his money? The purchaser should not expect to get what he should use,

with the present price of cattle, for less than one hundred dollars, and from that to one hundred and fifty to two hundred dollars. Was that calf worth but \$50 when fourth-grade Texas calves were sold in Kansas City the last of October for \$37.50 apiece? Were these calves sired by a \$50 bull? No, not at all; if they were not, they were not worth that price and would not have brought it.

This is a question in which we have as much interest as in any other one that will come before us. We are not in the business for our health; our object is to make money, and we do not want to put such prices on our stock as to be out of reason. We want the buyer to get the worth of his money, but we want to be paid fairly well for the pains we take in rearing our calves; and if we cannot do that we had better sell them as steers, and not sell them as male calves. That may be a question to be considered later on, how we can get a better price, or, in other words, by what means we can agree among ourselves to sell for what they are worth and breed the kind that is worth the money that we ask. That may be put in the form of a resolution later on.

DISCUSSION.

Mr. Robbins: In one sense of the word, we might get something out of it by standing together in the matter of price, but it seems to me it is a question of pretty nearly every one for himself. I think the quality of the animal to be sold will cut more figure in the price than anything else, unless it would be the breeding. Another thing which figures largely is the man who wants to buy. If he wants to buy a good animal he is not going to stand on a few dollars in the price. It seems to me that Mr. Folsom's remarks were very appropriate, for none of us can afford to breed Shorthorns for such prices as he spoke of. Recently I talked with a breeder, who claimed that he could make more money selling cattle to ranchmen than he could selling them in the eastern markets. This will, in measure, have to work itself out.

Mr. S. R. Quick: As you are all aware, I have not been in the business lately to a very great extent, but I was for a number of years. I do not think I ever sold a calf for less than \$100. I thought if I could not get that they were not worth breeding, excepting for feeders. There is no money in breeding and selling them for less than \$100. When we buy we want an animal that is suitable to head our herds, and one that has a pedigree to suit us. We can come to an agreement as to prices among ourselves, but will we all stick to it? I take it that Shorthorn breeders are an honorable set of men, and if they make an agreement they will stick to it. They can agree to not sell for less than a certain price, and if they have a calf that is not worth the price to sell it for a steer. There is a large territory in which Shorthorns are bred, and all the breeders have more or less males to dispose of, and if they cannot agree on the

price they will sometimes take less than the animals are worth. I do not think this is right. I think with the facilities we have now for dehorning and making good steers of them, it is better to dehorn them and sell them for beef than to sell them at a low price.

Mr. Hammond: Many of our Shorthorn breeders are small breeders and really depend upon the sale of their calves for their bread and butter. I have a neighbor who makes his living in that way, and you cannot get that man to see it in the way we do. I agree with you, that we ought to have at least \$100 apiece for our calves, but when a man is in need of money he will sell them for what he can get.

Mr. Thompson: I must confess that I have not had any rule. If a man came to my place and I thought I could get \$300 I would take it, and if I had a calf on my place that I did not want, I would sell it for \$50.

Mr. Douglas: On the other side of the question, I can say the first thing is to select the animal that suits the buyer, and then buy it if it is for sale, because the best a person can get is none too good for breeding. As for the selling price, there are people who think that a man extortions who asks \$50 for a calf. If a person can dispose of his calves at four, five or six months old, he can take less money than if he keeps them until they are fifteen months old, and the latter class are the ones in demand with the breeders. Many persons prefer to sell them at six months. When a breeder goes to buy he should select the best animal he can get, and then buy it if it is for sale.

Dr. W. J. Quick: We have heard from those with whom the bread and butter cuts a figure, and from those with whom it cuts no figure. Now, I know of a case where the bread and butter cuts no figure, but where the question of milk did. In this case a person owned a very fine calf, which would probably be worth \$100 at one year old. The mother of that calf was a very fine milker, and was the only milker available at that time. They were offered \$50 for the calf when it was two and one-half months old, and accepted it. I think it was better to do that than to do without the milk of that cow and keep the calf until it was a year old.

These things, it seems to me, must be governed by circumstances. There are no two breeders that have the same environment. An old breeder whose herds have first-class pedigree and reputation, can sell a calf for more money than a young breeder, because the buyer is influenced by circumstances. It is possible, perhaps, to say that we will not sell a calf under a certain figure, and then raise the calf to an age at which it would bring that figure. It does not seem right to fill the country with sires at a price that does not seem to justify the handling of a first-class herd. It is not justice to the promoters of good blood, and steers better be made of calves that will not give good returns, and canned beef of the cows that continue producing them.

Mr. S. R. Quick: I move that the Chairman appoint a committee of three on resolutions.

Motion seconded and carried.

The Chairman appointed as such committee: Messrs. Quick, Mitchell and Robbins.

The following resolutions were referred to the Committee on Resolutions:

RESOLUTION No. 1.

Whereas, Branches have sprung up and breeds are forming from the Shorthorn Durham; be it

Resolved, First, That the Indiana State Association of Shorthorn Breeders shall be reorganized;

Second, That it take upon itself the original name of the breed, viz., Durham;

Third, That said name be substituted for the name Shorthorn throughout our preamble, constitution and by-laws; and,

Fourth, That a committee of three be appointed to rewrite our constitution entire, in uniformity with this resolution.

RESOLUTION No. 2.

Whereas, This Association has not issued a breeder's directory since 1887; and,

Whereas, Said directory was found advantageous to our Association, and its reissue is deemed advisable; therefore, be it

Resolved, That the Secretary of this Association be instructed to begin the compilation of a new directory of the breeders of the State of Indiana, and that said directory shall be prepared for submission at our next annual meeting, and published in 1900.

RESOLUTION No. 3.

Whereas, There seems to be a demand for holding our annual meetings in different parts of the State; and,

Whereas, The Dairy Association of this State and various associations of other States have greatly increased their attendance and membership, and developed a much greater interest by so doing; be it

Resolved, That after the meeting of 1900, which shall be held as usual at the State House, meetings shall be held successively in each quarter of the State, at some point recommended by the breeders of the quarter where said meeting is to be held, and that after each quarter has had a meeting the fifth meeting shall be held at the capitol, in 1905, and so on, returning to the capitol each year exactly divisible by five.

A paper on "Color," was read by Mr. S. R. Quick, Brooklyn, Ind.

COLOR OF SHORTHORNS.

The question of color is of vastly less importance than that of quality, provided that the breed-color—red or white, or their intermingling roan—be in evidence. Then, the color of the breed—red, white and roan—should be adhered to very closely, but with no preference for either to the disregard of the make-up of the animal. Color is but the characteristic of a breed, and one of far less importance than those characteristics making up the market value of a beef animal. But as many fail to realize this, and seem to continue to err, I deem the subject of color of great importance to the breeders of Shorthorns.

The mania for red has, I think, to an appreciable extent, deteriorated the breed. This fashion, or fancy, for red cattle sprang up several years ago, and almost every red male or female was used for breeding purposes, regardless of quality or pedigree—the one idea of color seeming to be the only thing looked at. If we were going to match a pair of horses for market would we take, for instance, a pair of blacks, one fifteen hands, light harness, and the other sixteen hands, heavy draft? You would say they are not matches, but I would say, yes they are, both coal black, showing that I had only the one idea—color. The same might be said of mating any stock. For instance, take a black hog and mate it with anything that is black, regardless of uniformity of characteristics other than color alone. Breeds have not been formed in such a manner, but one breed has been injured by a mania for red regardless of quality. This fancy for the red has led nearly all beginners in the breeding of Shorthorns to commit grave mistakes by turning down or passing by almost unnoticed, a rich, mellow, mossy-coated roan, with his brilliant colors blending together as in the representative of no other breed, and whose intermingling colors have for so many years been illustrious in the Shorthorn herds of Britains and Americans. Roan is distinguished as the characteristic color of the breed, combining red and white, and giving us our banner colors of red, white and roan. There is no other breed of cattle that has the same rich and attractive mixing and blending of the red and white as is seen in the well-bred Shorthorn.

I admire and in my breeding have often used a nice cherry red or red and white. But I think I might say that I know that exclusive breeding to reds, and especially dark reds, brown or nearly black, as Allen terms the color with dark noses and muzzles, is carrying and will continue to carry and hasten with it the retrogradation of the Shorthorn breed. We have a great many people, and I am sorry to say some of them are breeders in a small way, that think that an animal must be red to be a pure Shorthorn. But such is not the case with our best breeders or feeders. I have frequently heard our best feeders remark when they saw a roan steer, "There is Shorthorn blood and a good feeder." One of our pioneer breeders of this State, W. W. Thrasher, who was known far and

wide, and who was a good cattle judge, always remarked when he saw a roan, there had been a Shorthorn bull about when that steer was got. On the other hand, novices in breeding will ask, when they see a roan, or red and white Shorthorn, What breed is it? and when you tell them they will remark that they thought all Shorthorns were red. No doubt you have all heard the same thing a great many times. But take the opposite case. You never saw a roan from a mixture of red and white that was not either a Shorthorn or had Shorthorn blood in him. Take the famous Shorthorn herds that won the prizes all over the world and they were principally roans. Any one can recollect back a few years and know such to be facts. And some of us recollect the famous herds exhibited by the noted breeders of their day 30 or 40 years ago. Such men as Gen. Sol. Meredith, Jerry Woodruff, W. W. Thrasher and others, with their mellow-coated red and white and roans. Allen's History of Cattle says:

"The true colors of well-bred Shorthorns range from pure whites to deep red, and between these colors either of which frequently comprise the whole animal, their intermixtures in all variations of roans, as light roan with the white predominating over the red, red roan with the red prevailing over the white, as either may exceed over the other in different degrees." The red may also vary in shade from bright or yellow red into the deepest mahogany. But the clear white and full red colors, either by themselves or intermixed in various beautiful and picturesque proportions, were the prevailing colors, and I see no good reason, other things being equal, why a white, as it truly belongs to the breed and descended perhaps from red or roan parents, should be a defect in the useful quality of the animal having it. It is simply yielding to a once popular but fanciful prejudice that to a great extent has injured Shorthorn cattle as a breed and subjected such breeders to just criticism and unsatisfactory returns from their efforts.

Mr. Folsom: In that line I will submit an object lesson. There is a snap shot picture taken in July of the Queen's herd at Shaw Farm, England. I would like to have each member examine it closely, and then see if he thinks he can be a red and red man only as far as the color of Shorthorns is concerned.

Mr. S. C. Hanna, of Kansas, paid a visit to the leading herds of Great Britain in the summer of 1898. Of his visit to the herd of Mr. Willis, of Bampton Manor, he says: "No other Shorthorn breeder has won so many prizes in recent years. During my stay the show herd came home from Cardiff to take on the finishing touches for the great Royal Show. They were all roans and fit representatives of the great herd." Mr. Hanna says of his visit to the herd of Mr. John Wilson, of Aberdeenshire, "I saw a most excellent white bull." He further says, "I noticed that every herd I visited in Great Britain, with one exception, was using a white bull, and the white bull was generally the best Shorthorn on the place." Of Mr. Marr's herd of Uppen Mill, Mr. Hanna says, "The sires Wanderer and

Spicy Robin are roans of remarkable quality." Of Mr. Duthie's herd, of Callynie, he says, "It is truly an aggregation of Shorthorn excellence. The great Scottish Archer, Pride of Morning and the white Count Lavender bulls are such outstanding individuals as one would expect to find at the head of such a herd. Scottish Archer is a roan with striking individuality, and is recognized as the greatest breeding bull in Great Britain since Freed Marshall. Pride of Morning is a prize winner and has achieved fame as a sire of show cattle; he is a beautiful roan."

Does the Shorthorn breeder who advertises his cattle as reds and reds only want further proof that he is not breeding the best? If he does, here it is. At the recent public sales of bull calves in Great Britain made by Mr. Duthie and Mr. Marr, the plumbs of the sales were roans. At the Duthie sale, the roan calf Pride of the Ring brought \$1,250, the roan Count Valiant, \$1,075; the roan Pride of Lancaster, \$1,000. These were the tops of the sale. Of the Marr calves, the roan, Scottish Champion, topped the sale at \$1,650.

Dr. W. J. Quick: Over at Mr. Allen's sale of Shropshire sheep, after the sale, they brought out a Shorthorn bull calf that was what you would call a white roan, and I think he was the best calf I ever saw. He was about six months old, and at that sale, where other Shorthorns were sold, \$155 was paid for him. He was brought out and sold after the sale of sheep had closed. We must admit that as against the question of genuine reds, that you will seldom find a red that is as good a handler as you will find in the roans and whites.

Mr. Robbins: There was a time when to stand up here and argue for roan cattle you would have nine out of ten men against you. I think the time has about come to drop the color question, and I don't think you ought to say anything more about it. Nearly every one has come to the same conclusion, and that is to just let the color take care of itself. Very few breeders now will discriminate against any color of red, white or roan.

Mr. Thompson: I think the color question comes in when you want to sell to a farmer who wants to breed steers alone. That man will want a dark roan, a red roan, if he can get it. A very light roan he does not want at all.

Mr. Folsom: There is a leaning in the direction of red with many people still. A man will often say that he does not care about the color, yet if he has a white and red and a roan bull in nine cases out of ten he will put a lower price on the white than on the others. If the buyer is just starting in the business, that is an object lesson for him. The new breeder is thus educated in a preference for the red and roan right from the start. The matter never should have been carried as far as it has, and doubtless the breed has deteriorated from that crank idea. Instead of building up you are going down hill in the breed, and you will find that in the localities where the red color fad has been firmly fastened, men

would not have anything but red, and the breed has deteriorated. Now, I think the lighter the color the more valuable the animal. For the last thirty years ninety per cent. of the animals picked out in the ring by the best judges have been the roans and the lighter colored animals. In the importations of 1876, by Mr. Grooms, the Duke of Geneva was imported at a cost of \$10,000, and he was a roan. I think Mr. Grooms deserves a vote of thanks from the Shorthorn fraternity, for when breeders of that caliber will use such bulls, the smaller fry will fall right in line.

Mr. Robbins: I don't think a breeder ought to sell an inexperienced man a white bull. There is a discrimination against white cattle, and we should be very careful not to get an inexperienced man into anything that will cause him trouble later on; and for that reason I would prefer to make a steer of a good white calf rather than to sell him to an inexperienced person. But if an old breeder was disposed to buy him I would be willing to sell to him. I believe that is some one had the courage to do it, and would take a good bull and a few good white cows and breed a herd of white cattle and fight the matter to a finish, he would make some money at it.

A paper on "A Model Shorthorn" was read by Isaac J. Hammond, Greencastle Ind.

Every successful breeder has his ideal animal, although but few are ever enabled to attain the object of their desires. However, great progress has been made, and the best animals of to-day are certainly superior to the celebrated ones of former times. In the selection of a model for examination we will not be governed by what fashion or even the show ring demands, but rather select an all around well developed animal, one of the everyday kind, the kind that the practical breeder and farmer delights in, because it is both pleasing to the eye and profitable. I shall not attempt entirety at originality in this description, as the ground has been covered by some of our most able writers, but perhaps we may be able to add something of interest here and there. Certain formations point with reasonable accuracy to the presence or absence of certain tendencies vitally affecting the usefulness of the animal for feeding or reproductive purpose. Thus, stress is laid upon the head for what it indicates. The old story of Thomas Bates accidentally catching a glimpse of the head of Belvedere protruding from a stable window is familiar to us all. He saw in that head and countenance a marked individuality, carrying with it the strength and masculinity of an impressive sire. The head should be well proportioned in length, breadth and general symmetry. It carries some unerring signs of constitution, although some of these are not compatible with beauty. The horn should be strong at the base with a graceful curve either forward or upward. The ear upright, large and thin; there should be good breadth of face from eye to eye and from eye to nostril. The eye should be large and expressive. The muzzle should not be coarse, the nostril wide and dilated, the mouth large but without coarse-

ness. The lower jaw should be in good proportion, short enough to give it strength, and it should be free from any superfluous skin or tendency to either muscular or bony growth. The head should be well placed on a good, strong neck, and to insure strength the neck should not be too long. The neck should extend backward on a level in the cow, and with a gradually rising crest in the bull, deepening and widening as it approaches the thorax, where it should connect in a smooth expansion, so that it can hardly be noticed where the neck terminates and the chest or thorax begins. The neck should be free from hanging skin or dewlap. The chest or thorax (from which spring the brisket, shoulders and foreribs) should be deep, broad and full, indicating robustness and good constitution. The brisket should stand prominently forward, be wide and let down on a line almost, if not quite, to the knees. The shoulders should be broad and even at the tops, meeting the back on a level in the rear, descending in an oblique direction, spreading outward and smooth at the shoulder points, thence sloping gracefully and tapering symmetrically into the foreleg above the knee. The knees should be round, muscular and stand well apart. The bones below should be short and strong, free from any lymphatic tendency and terminate in a good flat hoof. The foreribs, springing in a well-rounded arch from the spinal column, should be well expanded, long and deep, giving abundant space for a well developed heart and lungs. Also developing the foreflank into full breadth and levelness with the remainder of the thoracic and abdominal cavities. The crops should be broad and well covered with flesh and preserve the straight line from the shoulders to the afterribs. The top line along the back should be level from the neck to the setting on of the tail. The loin should be broad and full enough to allow no depression in front of the hips and should come up full to meet the top line. The hips should be wide spread and smooth without any tendency to bone, and on a level with and forming a part of the top line. The rumps long, full, broad and level, narrowing gracefully from the hips to the pin bones, which should be wide apart and well covered with flesh. The tail should be strongly attached to the backbone and should leave the top line at as near a right angle as is possible; it should be bony and tapering towards the brush. The ribs should be well sprung and extend well back towards the hips. The flank should be full and low and form a good line with the bottom of the thorax. The thighs should drop perpendicularly from the pin bones, broad on the upper sides and full throughout, the flesh running well down towards the hocks; in the male they should be especially muscular and strong. The hind legs should be straight and stand well apart. The hock should be clean and strong, free from any enlargements and should taper into a strong, flat leg below, ending in a well-spread and strong hoof, similar to the foreleg. The twist should be broad, full and low. The hair should be fine, the hide moderately thick, strong and loose, easily moved by action of the hand, giving it a mellow, elastic handling quality. These

essential points of individuality, when properly combined with breeding, disposition and color, should give us a model Shorthorn. The indications point to a bright future for Shorthorn breeding if we will only take warning from the past and breed a business animal. Such an animal is always in demand, hence it should be the most desirable. Combine good blood and individuality and let the theoretical give way to the practical. Use the same amount of judgment in the selection of breeding animals that you would in the selection of grain for seed. Select the good, reject the bad, and our modern Shorthorn will be an ideal animal.

DISCUSSION.

Mr. Quick: That is a very good model of a Shorthorn, and I am glad to know that we have a young breeder who is able to get up such a good paper. I hope he has some of those model cattle, for that is the kind we want to breed and show and sell in the ring. I think it is necessary to have that sort of a paper once in a while to remind us what our Shorthorns ought to be.

Mr. Folsom: Mr. Hammond, how would you go to work if you had certain classes of females to approximate that model? Take the females as you have them to-day.

Mr. Hammond: The Shorthorn females that we have to-day, so far as I can see, outside of the English top cattle, are too small and fine boned. I think we have been inbreeding too much, using blood of the same family. My opinion is that stock ought to have an out-cross. In fact, we have found in our plainer bred animals that with one cross of the Scotch sires we have been able to produce a much better type of animal than their dams were. I would not want to intensify that. I think all of our prominent Shorthorn breeders have found that when they breed a certain stock they have to cross to intensify.

Mr. Folsom: My idea in breeding Shorthorns is to fix a model and try to reach that. The first thing would be uniformity of herd. If some of the cows were rather long in the leg and others short, as long as I could not be able to keep two or three males I would adhere to one class or the other and try to even them up and get rid of the others, unless I had access to some herd outside where I could cross. I would take then the weakest point in my cow and the worst point to make better, and I would find a male that was exceedingly strong in that point, if possible, and should let all the other weak points in the male go if he was exceedingly strong in that. If the cow was strongly bred in line and the weak points of the male would not change it materially I would stop there on that one cross, but every time I selected a new male I would select one who was strong where my females were weak and would let all the other nice points go. That is my idea of trying to work up to a model. First, study the character of what a Shorthorn should be to be perfect, and

then try to work up to that. That was Thomas Bates's idea, and that is the way he built up his herd. I believe you must establish a type of your own, get your cattle uniform and then if you have one or two very valuable cows that you don't want to dispose of that don't conform to that type, if you know of a male in the country that will remedy that, keep them and send them there.

Mr. Robbins: Suppose your advice was followed and the calves had the weak points of both animals, what would you do?

Mr. Folsom: I should say it was a miss and should go no further with it.

Mr. Robbins: My plan is to get the best bull that can be obtained, then no matter what the size of the cows or whether they are rough or smooth, if the bull is of the right kind, use him and you will build up a herd of cattle that will improve faster than in any other way. Of course I would make exceptions to any general rule, but that would be my rule to breed up a herd of cattle.

Mr. Mitchell: All judges in the show ring ought to be required to give reasons for the decisions they make. If the judges are required to give their reasons it would be an educator to the men who stand around and look at the cattle, but do not know why the ribbons are given.

Dr. Quick: A few years ago we discussed that same question in this Association and appointed some expert judges. I think it is right for the public to know why a thing is done. You can take a score card and go over every animal, and hand that card to the different competitors and let them know what and why you decide. It is a big undertaking, the inexperienced think, but not so difficult on study and practice. I think we should pass a resolution here against showing breeds together. We should have score cards for every breed. You can not find a man on earth that knows anything about breeds that has not a prejudice for some particular breed. I do not believe the breeds ought to be shown together; it does not educate and amounts to little.

SECOND SESSION.

The second session of the Indiana Shorthorn Breeders' Association convened at 10 o'clock, January 3.

The President, James D. Williams, of Pond Creek Mills, presided.

The first business was the report of the Committee on Resolutions.

Mr. Mitchell, as chairman of that committee, reported as follows:

Mr. President, the committee to whom was referred several resolutions, beg leave to make the following report:

Resolution No. 1.—We, your committee, do not concur in this resolution.

Resolution No. 2.—The committee recommend the adoption of this resolution.

Resolution No. 3.—This resolution recommends the holding of the Shorthorn Breeders' Association at different points in the State, and also further recommends that the meetings be held at the capitol in 1900. We think it best to have this resolution submitted to a committee appointed by the President at this meeting, said committee to make its report at the annual meeting one year hence, thereby giving the members of the Association time to act intelligently upon the matter suggested in the resolution.

Your committee submits the following resolution:

Resolved, That the expert system of judging cattle be continued by our State Board of Agriculture; also,

Resolved, That the Shorthorn Breeders' Association request the State Board of Agriculture to publish the name of the expert judge at the head of the Shorthorn list, and that such expert judge be requested to give his reasons for the awards made.

Mr. Folsom moved that the report of the Committee on Resolutions be accepted.

Motion seconded and carried.

Mr. Folsom moved that the last resolution submitted by the committee be amended by striking out provision for the printing of the name of the expert judge at the head of the list.

Mr. S. R. Quick: I should like to have the name of the judge printed. It is only just to the exhibitor to know the name of the judge before coming on the ground.

Mr. Folsom: We want the cattle to come here and there may be some personal difficulty between the exhibitor and the judge, and for that reason the breeder might not come on with his herd. It is well enough that the State Board should know the name of the judge, but they need not publish it and the breeder need not know it.

Mr. Robbins: It is to avoid trouble that this resolution was presented.

Dr. Quick: I am sure that it would have given me as a judge more satisfaction to have my name on the list when I was a judge. I know of one case where a man thought he could not get fair judgment and I went to him and convinced him that he could. The poultrymen have done this for years, and they will not come unless they know that they are to have a competent judge to pass on their fowls. We are working to advance the interest of the Shorthorn and other beef breeds, and if it is for their advantage to pass this resolution we ought to do it.

The original motion is that we ask the State Board of Agriculture to publish the name of the expert judge at the head of the Shorthorn list, and that such expert judge be requested to give his reasons for the awards made.

The amendment is that the provision that the judge's name be published be stricken out.

Amendment lost, and motion as first offered carried.

Motion was made by Mr. Robe that the Shorthorn Breeders' Association take a short recess in order to enable them to attend the session of the State Board meeting being held in the State Board rooms.

Motion seconded and carried, and the meeting was adjourned for fifteen minutes.

The next number on the program was a paper on "Show Yards," by Mr. W. S. Robbins, Horace, Ind.

Mr. Robbins stated that he had nothing new to say on the subject. He said his general observation had been that local shows have been well attended by Shorthorn breeders throughout the State. He said that all were aware of the result of the shows. He said he would give the rest of the time assigned to him to Mr. W. J. Quick, of Brooklyn, Ind., who followed with a paper on

RETROSPECTION AND FUTURE OF SHORTHORN DURHAM BREEDING.

Why you should have selected me to review the past of Shorthorn breeding, I do not understand unless it is because of my close relationship to our interesting industry since childhood. Or it might be that an idea prevails that I could pass with less prejudice upon the efforts of Indiana breeders at least, since I have been out of the State, employed by our Government for several years in the Experiment Station work, and have again returned to my native soil long enough to study the conditions at home again.

Be that as it may, I have never lost sight of my Hoosier brethren or abandoned my financial beginning in Indiana. More, my environment and associations have always enabled me to keep in close touch with the Shorthorn interests of the United States.

Pardon a word of biography, as it may assist some father and son. My enthusiasm was first kindled by my father's training and early operations with and admiration for Shorthorns, in the sixties. "A chip off the old block," as it were. This greatest of all starts my indulgent parent cautiously fanned into a blaze, to which fuel was added by that able agricultural scientist, Professor Ingersoll (now deceased), as he guided my work through Purdue University. After continuous encouragement from my friends of the Indiana Farmer and others, my interest and enthusiasm reached its zenith when, as your Secretary in 1886-7, it was my pleasure to come into still closer touch with the Indiana breeders by compiling a complete directory under the auspices of this Association. But to our subject.

Retrospection is not always pleasant, though usually profitable if the cogitator is "looking backward" with as his object the improvement of his future operations. It is especially beneficial if it is his intention to pursue the same line of business. There are few of us but appreciate the

value of experience in its application to future operations. Practice makes perfect, 'tis said, and yet so long as cattle breeders and feeders must cater to the fancies of so whimsical a human race, we can not hope to reach perfection. However, we must ever respond to the demands of such a human family, but with scientific advancement, the resultant increased stability of desires and the nearer approach to the millennium, the more nearly can everything reach perfection. Even a breed of cattle, because of the uniformity of the demand, more nearly reaches perfection. Demand controls the supply. This is not only true as to quantity, but also as governing the quality of the demand. Let us then, recapitulate and repeat the idea that after reaching a stable quality—demand—the breeder can gather himself together, as it were, view the past, conscientiously look his errors squarely in the face, and establish his plans for his future course. In the past this has been a difficult task because of the changing demand.

Notwithstanding this difficulty of the past, breeders have made their mistakes, and many of them. It is a true saying that "our handsights are always better than our foresights," so true that we would be tempted to call a man an egotist who should say he had made no mistakes in his breeding operations of the past decade. We grant there are those who are more nearly infallible than others, but we have all made more or less errors. Where is there a class of breeders that have not made blunders? All have chased the will-o'-the-wisp of fictitious values, of color or pedigree. Too many have done office breeding regardless of individuality, just so there was in existence and going along with the pedigree some sort of an animal. Your speaker has seen many heifers pass under the hammer that did not compare favorably with half and three-quarter bloods, and yet they sold because of the pedigree string, frequently for hundreds of dollars. Our Bates friends particularly know all about this, but it being their dance and as they paid the fiddler, we would not say much had we not been kept awake and full of indecision as to whether or not we should engage in the merrymaking.

To too great an extent, yet eight or ten years ago, long purses and longer pedigrees ruled the Shorthorn cattle business. While the unreasonable fictitious prices of years ago were not strongly in evidence, many a herd was being increased by money and pedigree as the sole additional assets and they illy proportioned to the liabilities assumed by the breeder. The liabilities do not refer necessarily to an outstanding note obligation, but not infrequently tuberculosis and other hereditary troubles were introduced in the herd through what Professor Johnson has aptly called "office breeding and management." This is no phantom, but you all know of these mistakes, some of which have been so serious as to afflict half the herd, through a bull purchased solely for his pedigree. It would not do, gentlemen. True merit wins and none found it out more fully than those who made the errors nor wheeled quicker into line than our Indiana breeders when they were fully convinced. Cattle had gone down, down,

down, and Shorthorns were no exception to the rule. Many good animals, even fine heifers, went to the butcher's block. Many sensible men grasped the occasion to dispose of all evidence in their herds of their hobby riding and mistaken judgment by disposing of all unworthy line-bred, fashionable, long-pedigreed representatives. Understand, we do not object to pedigree, but want it, however, only with a good animal.

It was a good opportunity to say "we will just do a little crossing, as Shorthorns are not worth much anyway." Shorthorns and all cattle had reached low water mark. Those of extra quality were yet, as always, in some demand. Bates Shorthorns were not wholly bad, but Scotch Shorthorn bulls were making show herds on every opportunity. Many saw it promptly and, as any one should do when in error, turned about. Our late friend, Col. Moberly, of Kentucky, and many of our Indiana breeders were among the first to top-cross their herds with Scotch bulls.

Now began the change. All Shorthorn men had their eyes open; they were closely examining the balance sheet and the results of years of breeding of their own not only but in other herds. A time had arrived for careful study and deep reflection. Numerous they were who could not stand the pressure of either their breeding mistakes or the helpless condition in which their errors had set them adrift on the financial sea, and as a result they ingloriously abandoned the Shorthorn ship altogether, fortunately too relieving the precious craft of a water-logging burden.

The good sailors remaining with the grand old ship determined to catch the tide and rise on the crest of the wave. They had bred judiciously as they thought but from a line-breeding standpoint. Now they were ready to breed judiciously from the true Shorthorn standpoint of quality. That which first formed the breed, made pedigree desirable and possible and gave the founders of the herd their early exhibition animals, for example, to the Colling Brothers, reputation, through the quality of the famous "White Heifer" that traveled. The same has given us of this day all our show animals and has ever since kept our favorite breed in the ascendancy, notwithstanding, like any other shining light, it has necessarily had those about it with scorched wings. There were, however, comparatively few cases of "the bird with the broken pinion that ne'er soared so high again," for the most of the breeders faced the issue squarely, looking first to the half of the herd easiest to control, and yet most important half, following this up with wisdom and method in breeding and that care, feed and attention to insure the best possible development.

A sensible man when ill usually knows the medicine he takes. Shorthorn men are sensible men and wise, as evidenced by their being in the business; and again by their judicious weighing of themselves and their business in the balance. It is not surprising that they found the panacea for all their ills in the true standard—quality—sweetened with a good pedigree, as evidence of breeding, not frequently, as of yore, a thing com-

pletely sugar-coated with pedigree and the money that bought it. Sugar coating has hidden many a nasty pill and bitter, though some may have been, that the Shorthorn fraternity took, there is surprisingly small deleterious effects from it, due doubtless to the vigorous constitutions of our favorites. The founders of the breed in the county of Durham on the river Tees knew not how well they and nature had builded.

The sensible abandonment of a search for dross, which glittered only, and a wise effort for the pure gold has rewarded us to-day with the occupation of the most eminent position held by the breeders of any cattle on the face of the globe. The show ring, the sale ring, the block and the year's importations all bear me witness.

In competition with other breeds we have not to complain. The sale ring results are not to be ashamed of but to be gloried in, as having shown the greatest evidence of conservative, sensible, legitimate business, removed entirely from fictitious values, and strivings for a long line of royally named, illustrious ancestors. The averages have ranged for the year from \$65 to nearly \$400, with extreme prices running to \$500, \$800, and in one case \$1,000. One thousand dollars is not unreasonable for him that is to represent the half of a well-bred herd. The prospects and breeding-demands also justify the placing of hundreds in females if they are of proper quality.

On the block none have excelled our favorites. Among the steers of the various breeds, fed for exhibition and finally reaching market at Chicago as Christmas beef, Shorthorn steers touched the top price, \$7 per hundred pounds, and the highest price paid in four years. Aberdeen-Angus steers followed next at \$6.75, with Herefords third, at \$6.50.

The importations for the year would also indicate that we are rapidly rising, we won't say to our zenith, for we believe there is still greater future for Shorthorns, but more Shorthorns have been sought across the water for America this year, Mr. Robbins says, than any year since 1883. Canada has also brought over more than for years. Seventy-four head have been imported to the United States.

No, we have not reached our zenith. The inquiries in all newspapers for breeding cattle, and often coming from beginners asking about the best cattle, but indicating a weather eye for the Durhams, are numerous. One can hardly pick up a rural paper that has not something in it from evidently an entirely unbiased standpoint that would make our opponents envious and jealous of the eminent position of our breed. Almost every one who writes on feeding cannot refrain from calling attention to his preference for Durham blood. They all know and speak of their early-maturity characteristics and their greater comparative avoidrupois. Everything seems in our favor and all indications are for a still better year in 1899.

Our future depends upon many things. The road is not wholly smooth.

We have most effectually improved its worst condition, but we must be ever on the alert and constant students of the problem of breeding to best advantage.

There are other problems. The Herefords are favorites in many sections, but their heavy horns and heads are a drawback to their general introduction. The Angus have not that incumbrance, and are greatly in favor in consequence. Besides, both these breeds are our greatest competitors for place at the fairs and on the block. The latter standing recently second only to Shorthorns in the market. But both have improvements to make of which none know better than their respective breeders. Our Hereford friends know the disadvantage of the large longhorns and the need of better rear development. The Angus are after better backs and rounder barrel, with more spring in the ribs.

Our breed has come nearer responding to every demand than any other. It has ever been the most successful dual-purpose breed, at the same time holding more frequently the first place as beef animals, and not infrequently as dairy representatives. It has produced the Polled Durham and filled a place Durhams were not supposed to be able to occupy a few years ago, but a place the value of which is not now fully appreciated. The breed has not suffered from any of these improvements, but has become the more acceptable and prominent. Our original dual-platform has been improved by a number of advantageous planks. The most important doubtless being the introduction of the Scotch cognation and its amalgamation with the Bates ring of the party, in such an amicable manner and with results most gratifying and satisfactory. But let us be cautious and act judiciously, remembering that "united we stand, divided we fall." We are inadvertently dividing. Do we not all really belong to one party—the Durham party?

This was the original name of the breed when for distinction from longhorn Durham came the acceptance of the term, Shorthorn Durham. Now the longhorn Durham is non est. But we have two new and worthy branches to our Durham party, viz.: Dairy Shorthorn Durhams and Polled Durhams. They have sprung almost into separate parties, and with Shorthorns all are unquestionably for sound money.

Our interests are so strongly in common with the Polled Durhams and theirs with us, as they must depend upon and seek Shorthorns for new blood, that we should not get too far apart. In fact, when pure, the polled characteristics being the only difference, we should be one association. They are Shorthorn Durhams with the horns bred off in many cases and not solely Shorthorn grades from the old "muley cow."

There is nothing to prevent Polled Durhams from being recorded in the American Shorthorn Herd Book, when having a pure Shorthorn lineage, and many of them are. Those that can be recorded in both herd books are

called "double standard." We all know there are no better cattle than Short-horn Durhams, and those of us who feed large numbers know the immense advantage both financially and physically, of handling cattle without horns. If there is an advantage of breeding without the horns then let us accept the conditions at once, and not do as did the breeders of pure Bates, viz., remain in line until we get completely out of line. The advantage of hornless cattle over horned is so great and the loss of dehorning being often not inconsiderable, this matter should have our careful consideration. Your writer knows those who will use a double standard bull on their Shorthorn herds. I see no reason why eventually with care the individual merit may not be quite as good in the Polled Durham, and they do compete successfully with the Angus in the only point wherein the Shorthorn Durham fails, that is in being hornless. The Polled Durham breeders have no "cinch" on the business, for any one can breed the horns off, with care. That same care that has enabled our thoughtful breeders to select and mate so as to breed some of the leg off and make other improvements in our favorites, would enable them to do it more successfully and speedily and with less deleterious effects, because of experience.

This association should be so reorganized that all interests would be covered. The Durham Cattle Breeders' Association of Indiana would cover the case fully. We would be pleased to hear the pros and cons of this question.

Another matter in this connection needs our attention for the future advancement of our interest in Indiana. Shortly after my return to our fair State, imagine my surprise at hearing one of our prominent breeders say our association was "dead in the shell." As you all know, it was my favorite association, having as secretary for four years assisted in building it to its highest point. History does repeat itself, it is said. It seems to be true at least as regards our association, for many of us can call to mind another time when there were not many members, other than the officers, in good standing, i. e., with their annual dues of one dollar paid. "Money makes the mare go," and as well was found to make this association go to the front.

When your speaker twelve years ago proposed the advantages of a Shorthorn Breeders' Directory, it was said: "It can not be done without money, and the Secretary must be paid for this extra work, postage and stationery, and there is no way of getting the money." I agreed to undertake it with but a small amount of money in our treasury. Let us see what was accomplished, drawing our information from a copy of said directory. It contains 128 pages, and our constitution and by-laws. Seventy-two of the ninety-two counties in our State are therein represented, showing in many cases sufficient interest to have a County Shorthorn Association. There were doubtless other counties not reported. The name and address of every one owning one or more registered animals was secured with their address, and published in the rear of the directory.

They reached the surprising number of about 1,200 breeders, of whom 208 were members in good standing of this association as shown, commencing at page 9.

Nothing would do the breeders of Indiana more good than a repetition of this work. It should be done at least once a decade and enough copies printed to enable many to be sent from our State. It would bring buyers into our midst and show them a Shorthorn nest. No other State has ever made such a report of her breeders and their herds. It would direct and call attention to us as nothing can. We need to renew that enthusiasm of years ago. It requires a love for and interest in the business for success. Some office work is necessary, but actual contact with our animals is more necessary, and both are requisite. The breeder must be a careful, judicious wideawake business man, looking as carefully to his interests as the merchant or banker. Then the latter, even, will not take off a greater number, nor more valuable coupons in comparison to the investment than the Shorthorn breeder. It is not always smooth sailing in any business. We must not be over sanguine, but we may rest assured that by personal attention, seeing that details as to feeding and care are faithfully performed and by carefully selecting and mating the proper animals, our financial success and an enviable future for our favorite breed is unquestionably determined.

DISCUSSION.

Mr. Heagy: Several points in Mr. Quick's paper strike me very favorably, especially the one regarding hornless Shorthorn cattle. I am in favor of dehorning. I have not a Shorthorn on my place that has not had the horns taken off. I see Polled Durham cattle at the fairs; some of them are pure Shorthorns. I am proud of my Shorthorns without horns. It is necessary to have horns to stand in the show ring, I suppose. I trust the breeders of Shorthorn cattle will encourage this work and raise cattle so that the Association can be kept up as it was in former years.

Mr. Folsom: I think the Association will gain nothing by joining hands with the Polled Durham cattle men. I do not see how we can change the name of our Association, unless we do it locally. Ours is not only a national but an international association. We would like to have the others ride in our boat, but we are not ready to turn it over to them yet. Mr. Heagy says he wants horns off. Now, I want horns on. I think horns give character to the animals. I should not want to buy a dehorned animal to breed from unless I knew all about its family. I think horns as well as heads in general indicate something of the feeding qualities, disposition and general make-up. I have seen horns that would indicate that the animals were not good; and when I see a dehorned animal it makes me feel suspicious that the horns were too large and showed a character of cattle that was undesirable, and they were taken off. I do not

think, as I said before, that we will have to go to the Polled Durhams to maintain our standing. We all know the value of seventeens, and we all know that the value of Shorthorns has depreciated by the seventeens. The importations of seventeens contained two or three long horns that were mixed, and there was a Hereford. But the majority of them were kept pure. Now, any animal that traced to that importation has had a black eye. Why? Because you have had no absolute testimony that they were not mixed. Is there not danger that we are going to drop in line with this and use Polled bulls until we get in the same boat as the seventeens? You can not tell which are pure. You know that under the rules of the American Shorthorn Breeders' Association you can not register an animal that does not absolutely trace to a registered cow in the early days; yet you are laying yourselves open here by introducing that line of blood to impregnate your whole Shorthorn stock with an element that is liable to give you more trouble than the seventeens did.

The Polled Durhams were given a place in our show yards, and were given a special list for themselves until they arrived at a point where they thought to compete with us, and fair managers said they should come in with us, and they have never showed with us since.

Mr. Thompson moved that a committee of three be appointed by the chairman to consider nominations for officers of the Association for the coming year.

Motion seconded and carried.

The chairman appointed as such committee Mr. Robbins, Mr. S. R. Quick and Mr. Heagy.

The next number on the program was a paper by Mr. Heagy, who asked to be excused from taking the time of the convention, which should now be devoted to business.

Report of the Treasurer read by Mr. W. J. Quick.

Motion made that the report of the Treasurer be accepted.

Motion seconded and carried.

Dr. Quick: Attention should be called to the fact that membership fees and dues have been practically abandoned for the past two or three years. Annual dues for members are fifty cents, and new members pay one dollar.

Mr. Folsom: I suggest that each member pay a dollar, as there was no meeting last year.

Report of Committee on Nominations—For President, Mr. E. S. Folsom, Indianapolis; for Vice-President, Mr. Isaac Hammond, Greencastle; for Secretary, Mr. Walter J. Quick, Brooklyn, Ind.; for Treasurer, Mr. A. E. Leavitt.

Mr. Folsom: I move that the report of the Committee on Nominations be accepted, and that the Secretary be authorized to cast the vote of the convention for the candidates named by the committee.

Motion seconded and carried.

The Secretary cast the ballot for the nominees, and they were declared duly elected.

Mr. Folsom: I thank you, gentlemen, for the honor you have done me in electing me to be President of this Association. I feel greatly interested in the breeding of Shorthorns, and have always had a love for it. My interest will be with you, and my best endeavors shall be to make this Association a live one, and I think with the assistance of our Secretary, Mr. Quick, we will keep the Association to the front, and endeavor to place it where it was years ago.

Mr. Folsom: There is one resolution to be acted upon, the resolution on location of meetings. I move that a committee of three be appointed to consider this resolution, and report at the next convention.

Motion seconded and carried.

Mr. Williams: I move that resolution No. 1, as reported by the Committee on Resolutions, be laid upon the table.

Motion seconded and carried.

Mr. W. J. Quick: I think a Breeders' Directory would be of advantage to every breeder in the Association. The expense would not be very great, but the benefits will be.

Mr. Folsom: I think the numbers so reduced that a directory could not be profitably compiled at present. It might be done another year, when the Association is stronger.

Mr. Williams: I move that this matter be left in the hands of the President and Secretary of the Association, and, after consulting some of the breeders, if they think it advisable to issue a directory, that this Association empower them to use their best judgment in the matter.

Motion seconded and carried.

The chairman appointed Mr. Williams, Mr. W. S. Robbins and Mr. S. R. Quick a committee of three to consider the question of location for future meetings of the Association.

Adjourned.

NINTH ANNUAL REPORT
OF THE
Indiana State Dairy Association.

ANNUAL MEETING

HELD AT

Mooreville, Morgan County, December 14-15, 1898.

(STENOGRAPHIC NOTES BY A. O. RESER.)

Edited by H. E. VAN NORMAN, Secretary.

OFFICERS OF THE INDIANA STATE DAIRY ASSOCIATION.

PRESIDENTS.

C. S. Plumb, Lafayette, Tippecanoe County	1891-1893
Bartlett Woods, Crown Point, Lake County	1893-1894
W. S. Commons, Centreville, Wayne County	1894-1895
C. S. Plumb, Lafayette, Tippecanoe County	1895-1896
O. A. Stubbs, Lewisville, Henry County	1896-1897
S. B. Woods, Lottaville, Lake County	1897-1898
J. J. W. Billingsley, Indianapolis, Marion County	1898-

VICE PRESIDENTS.

Chas. C. Van Nuya, Franklin, Johnson County	1893-1894
J. M. Knox, Lebanon, Boone County	1894-1895
W. S. Commons, Centreville, Wayne County	1895-1896
Chas. B. Benjamin, LeRoy, Lake County	1896-1897
O. P. Macy, Mooreville, Morgan County	1897-1898
G. W. Drischel, Cambridge City, Wayne County	1898-

FIRST VICE PRESIDENT.*

D. H. Jenkins, Indianapolis, Marion County 1891-1892

SECOND VICE-PRESIDENT.*

Mrs. Kate M. Busick, Wabash, Wabash County 1891-1892

THIRD VICE-PRESIDENT.*

C. B. Harris, Goshen, Elkhart County 1891-1892

SECRETARY-TREASURER.

Mrs. Laura D. Worley, Ellettsville, Monroe County 1891-1893

W. S. Commons, Centreville, Wayne County 1893-1894

H. C. Beckman, Brunswick, Lake County 1894-1897

C. S. Plumb, Lafayette, Tippecanoe County 1897-1898

H. E. Van Norman, Lafayette, Tippecanoe County 1898-

OFFICERS AND MEMBERS OF THE INDIANA STATE DAIRY
ASSOCIATION FOR 1899.

J. J. W. BILLINGSLEY, President, Indianapolis, Marion County.

G. W. DRISCHEL, Vice-President, Cambridge City, Wayne County.

H. E. VAN NORMAN, Secretary, Lafayette, Tippecanoe County.

EXECUTIVE COMMITTEE.

J. J. W. BILLINGSLEY.

G. W. DRISCHEL.

H. E. VAN NORMAN.

S. B. WOODS, Lottaville.

O. H. MILLS, Mooresville.

MEMBERSHIP LIST.

ANNUAL MEMBERSHIP.

The following persons have paid one dollar into the treasury for membership in the Association for 1899.

<i>Name.</i>	<i>City or Town.</i>	<i>County.</i>
Andrews, B. F.	Greenfield	Hancock.
Barnhart, John H.	Logansport	Cass.
Batterman, Herman	Brunswick	Lake.
Baum, H. M.	Frankfort	Clinton.
Bailey, S. M.	Mulberry	Clinton.
Bracy, E. L.	Chicago, Illinois, 34 Clark St.	
Beane, John	Richmond	Wayne.

* In 1893 the offices of first, second and third vice-presidents were abolished.

<i>Name.</i>	<i>City or Town.</i>	<i>County.</i>
Beckman, H. C	Brunswick	Lake.
Beckman, J. H	Brunswick	Lake.
Benjamin, C. B	LeRoy	Lake.
Billingsley, J. J. W	Indianapolis	Marion.
Boyd & Drischel	Cambridge City	Henry.
Centreville Creamery Co . . .	Centreville	Wayne.
Cochran, M. A	Hanover	Madison.
Comstock, J. H.	Greenfield	Hancock.
Commons, E. L.	Richmond	Wayne.
Commons, Jas. A.	Centreville	Wayne.
Commons, W. S.	Centreville	Wayne.
Drennen, W. F.	Philadelphia, Pa., 37 S. Water.	
Drischel, D. W.	Cambridge City	Henry.
Douthett, R. M.	Highland	Lake.
Dungan, S. C.	Indianapolis	Marion.
Farmer, A. W.	Mooreaville	Morgan.
Furnas, R. W.	Indianapolis	Marion.
Gerlock, Adam	Crown Point	Lake.
Gibson, T. A.	Warrington	Hancock.
Gilbert, D. J.	Mooreville	Morgan.
Gilbert, J. J.	Lewisville	Henry.
Hadley, W. S.	Bridgeport	Marion.
Hall, Wm. C.	Lewisville	Henry.
Hanning, E. F.	Evansville	Vanderburgh.
Harvey, J. H.	Carmel	Hamilton.
Harmon, May	Greenwood	Johnson.
Harria, L. B.	Webster	Wayne.
Heacock, Edgar	Lewisville	Henry.
Hilfiker, Jas. H.	Westville	Laporte.
Hoadley, Arthur	Ockley	Carroll.
Hack, J. M.	Crown Point	Lake.
Holliday, J. F.	Mooreville	Morgan.
Holloway, Silas	North Manchester	Wabash.
Hollingsworth, F. M	Traders Point	Marion.
Husselman, Cal.	Auburn	Dekalb.
Isehour, J. E.	New Augusta	Marion.
Jenkins, D. H.	Indianapolis	Marion.
Jenkins, Harry	Indianapolis	Marion.
Jessup, H. B.	Friendswood	Hendricks.
Johnson, D. B.	Mooreville	Morgan.
Johnson, Frank P.	Howlands	Marion.
Jones, Frank L.	Utica, New York.	
Jordan, Samuel	Gale	Hendricks.
Kline, J. Slaton	Logansport	Cass.
Korty, J. N.	Lafayette	Tippecanoe.

<i>Name.</i>	<i>City or Town.</i>	<i>County.</i>
Knox, J. M.	Lebanon	Boone.
Levering, Mortimer	Lafayette	Tippecanoe.
Macy, O. P.	Mooreville	Morgan.
Manlove, George	Lewisville	Henry.
Matthews, H. J.	Brunswick	Lake.
McCain, Wm.	Hortonville	Hamilton.
Meyer, Otto A.	Cedar Lake	Lake.
Miers, L. M.	Bridgeport	Marion.
Middletown Creamery Co.	Middletown	Madison.
Mills, A. H.	Mooreville	Morgan.
Mills, Elwood	Bridgeport	Marion.
Mills, O. H.	Mooreville	Morgan.
Newby, Herbert	Spiceland	Henry.
Newlin, I. W.	Mooreville	Morgan.
Pavey, Mrs. J. S.	Lebanon	Boone.
Peed, E. H.	New Castle	Henry.
Perry, Glant	Columbus	Bartholomew.
Raab, Peter	Indianapolis	Marion.
Richmond, D. L.	Wheeler	Porter.
Roberts, W. H.	Howlands	Marion.
Rohe, John W.	Centreville	Wayne.
Rotermund, H. F.	Bemese, Illinois.	
Shafer, T. A.	Hagerstown	Wayne.
Schwegler, W. G.	Lafayette	Tippecanoe.
Specialty Publishing Co.	Cincinnati, Ohio.	
Scott, D. W.	Sugan	Jefferson.
Sudendorf, Edw.	Elgin, Illinois.	
Schlosser, Sam	Hanna	Laporte.
Shugart, J. V.	State Soldiers' Home P. O.	Grant.
Stubbs, O. A.	Lewisville	Henry.
Sykes, Wm.	Hobart	Lake.
Taylor, S. J.	Logansport	Case.
Thomas, L. W.	Elizabethtown	Bartholomew.
Thompson, J. L.	Indianapolis	Marion.
Van Arnam, M. F.	Columbus, Ohio.	
Van Norman, H. E.	Lafayette	Tippecanoe.
Wabash Co. Creamery	Wabash	Wabash.
Welborn, M. T., Jr.	Bridgeport	Marion.
Willson, Wm. D.	Osgood	Ripley.
Woods, Bartlett	Crown Point	Lake.
Woods, S. B.	Lottaville	Lake.
Woods, Wm. G.	Merrillville	Lake.
Woolen, G. V.	Indianapolis	Marion.
Woolen, W. A.	Springport	Henry.
Yours, P. G. & Son	Amboy	Miami.

LIFE MEMBERS.

T. E. Ellison, Fort Wayne, Allen County.
C. S. Plumb, Lafayette, Tippecanoe County.

HONORARY MEMBERS.

His Excellency, Hon. J. A. Mount, Governor of Indiana.
J. H. Monrad, Winnetka, Illinois.
C. B. Harris, Nagasaki, Japan.

Active Members	97
Life Members	2
Honorary Members	3
Total	<hr/> 102

COUNTIES REPRESENTED.

Bartholomew.	Hancock.	Marion.
Boone.	Hendricks.	Miami.
Carroll.	Henry.	Morgan.
Cass.	Jefferson.	Porter.
Clinton.	Johnson.	Sullivan.
Dekalb.	Lake.	Tippecanoe.
Grant.	Laporte.	Vanderburgh.
Hamilton.	Madison.	Wabash.
Counties represented, 25.		Wayne.

ARTICLES OF ASSOCIATION OF THE INDIANA STATE DAIRY ASSOCIATION.

AS AMENDED JANUARY 3, 1893.

Article 1. The name of this Association shall be "The Indiana State Dairy Association."

Art. 2. The officers of this Association shall consist of a President, Secretary-Treasurer and Vice-President, and an Executive Committee, consisting of the President, Vice-President, Secretary, and two others elected by the Association. A committee of two, to audit the Secretary-Treasurer's accounts shall be appointed by the President at each annual meeting.

Art. 3. The officers shall be elected to serve one year, or until their successors have been elected.

Art. 4. The regular annual meetings shall occur at such time and place as may be designated by the Executive Committee.

Art. 5. Any person can become a member of this Association for one year by the payment of a fee of one dollar. Upon the payment of ten dollars a person may become a life member. Honorary members not to exceed five may be elected, but said election is not to hold for over two years, excepting by re-election.

Art. 6. The President shall have power to call a special meeting at such time as in his judgment the interests of the Association demand.

Art. 7. The Executive Board shall have power to transact all unfinished business.

Art. 8. The Treasurer shall be the custodian of all the funds belonging to the institution, and pay out the same on the order of the President.

Art. 9. The officers of this Association shall perform such duties as usually devolve upon officers of similar organizations.

Art. 10. The President and Secretary shall each be allowed out of the general fund, an amount equivalent to their actual expenses while attending Association meetings.

Art. 11. These articles may be amended by a majority vote of the members of the Association present.

NOTE.—At the 1897 meeting at Lewisville the Secretary was voted authority to appoint an Assistant Secretary, who should help him in his duties, especially at annual meetings.

PROCEEDINGS OF THE NINTH ANNUAL CONVENTION OF THE INDIANA STATE DAIRY ASSOCIATION.

Mooresville, Ind., Wednesday, Dec. 14, 1898, 9:30 A. M.

The Indiana State Dairy Association was called to order by President S. B. Woods, of Lake County, with an audience of over one hundred.

After prayer by Rev. John Reagen, the Association was welcomed to Mooresville, and Morgan County, by Mr. H. C. Searce, as follows:

Mr. Searce: I have the honor, as well as the pleasure, of bidding you welcome to Mooresville to-day. If this large audience of citizens is not as enthusiastic this morning as you feel they should be, do not be offended; they will warm up and thaw out before you leave Mooresville, I assure you. On investigation, I find that you represent an industry the magnitude of which is probably not understood by the greater number of people. I confess that I myself was very much surprised when I investigated and found out some of the particulars relating to this industry. I find that in 1895, according to an estimate made at that time, there were some seventeen million dairy cows in the United States; eleven millions of them producing the butter, one million the cheese, and about five millions the milk consumed, and the value of these products, taken in the aggregate, was about five hundred million dollars, about seven dollars per capita for our entire population. By way of comparison, the wheat crop of this year was, approximately, six hundred million bushels. I suppose sixty-five cents per bushel would probably be a fair price. That would mean three hundred and ninety million dollars, and with the straw added, probably four hundred million dollars, or less than six dollars per capita. So the dairy industry stands about second; it is placed third; but taking into consideration the hay and corn fed to the dairy cattle, it is entitled to second place in our list of farm products.

So you are here representing that industry to-day, and we are glad to have you with us. It takes energetic, hard-working, intelligent men to successfully manage a business of such great magnitude. Work and education go together. One without the other would be a failure. It is this combination of intelligence and industry that has placed the United States at the head of the list of wealthy nations on the face of the earth. It was suggested a few days ago, in making some arrangements about receiving this Association, that there would be some difficulty, possibly, about providing places for all of you to sleep, and some one standing by said, there was no difficulty on that score, that a dairyman never slept. [Laughter.] When I look into your faces this morning I am convinced of one thing, and that is that you are wide awake the greater part of the time, any-

how. I want to bid you welcome to our town. It is sometimes customary to say to an association or convention that we turn the town over to you, or give you the freedom of the town. We are glad to say in this case we can do that without any fear. In the first place, we have no fear that any member of this Association would be led astray in our town, because you are not that kind of people; and the next thing is, you could not be if you wanted to, because we have no place here where you could stray off to that would hurt you. Again we welcome you, and hope your visit will be pleasant and profitable to you, as we believe it will be to this community.

Mr. J. J. W. Billingsley, of Indianapolis, responded on behalf of the Association.

Mr. Billingsley: Coming here on the train, some one asked this question: "What is the State Dairy Association meeting at Mooresville for?" I want to answer that briefly. In the first place, we had a very warm invitation to come here, and some good promises; in the next place, it is a goodly community. I am not a total stranger in these parts. I used to ride through this country and buy cattle and one thing and another, years ago; and there are quite a good many of the citizens here, as in the neighborhood of this town, that I am well acquainted with. I know the country to be a good country, and then, in addition to that, you know there is a great wave of expansion going over this country at this time, and a good many of us are expansionists, and we are reaching out to take in all the good countries and good things we can into this dairy association; and that is one of the principal reasons for coming here, and we hope that before this Association concludes its sessions we shall have a large local attendance. I know that the objects of this Association are not generally well understood where we meet, especially in towns that are a little remote from the great centers of population; and I am quite sure that the welcome which you have extended to us will be appreciated, and that those who have come here from different parts of the State will enjoy this coming together here, and enjoy the making of your acquaintance, and we trust that we may be mutually benefited in this coming together. Thanking you for the very hearty welcome you have given us, is all I wish to say. [Applause.]

SOME EXPERIENCE IN THE CREAM TRADE.

BY R L FURNAS, INDIANAPOLIS, MARION COUNTY.

From the time that we commenced to make butter in quantities large enough to make its quality important, we found that for eight or nine months we could make butter satisfactory to our customers, and conse-

quently to ourselves, but in the other three or four months it was utterly impossible to please either our customers or ourselves. The trouble would commence in November, reaching generally a climax in January, and ceasing in March or April.

Our contracts have always called for the delivery of cream not less than four times each week, but to the shipper whose herd is giving little milk the temptation is great to ship less frequently than the contract calls for, and thus it happened that the cream from herds giving a small amount of milk was often old before it reached us, and it also happened that the cream from these herds was generally bad—sometimes very bad—and never satisfactory.

From the above conditions, the conclusion was natural that the bad flavored butter was caused by the cream being too old.

In the winter of '92 and '93 one shipper sent us a small amount of cream, shipping not oftener than twice a week, and the cream was persistently bad. The next winter this shipper had several fresh cows, made several times as much cream as he made the previous year, and used for the first time a cream separator. The separator itself shortened the time between milking and the delivery of the cream at least twenty-four hours. The cream was shipped every other day. The quality this year was satisfactory. Was it any wonder that we thought at that time that the whole difficulty was in the age of the cream, and that in the fall of 1894 we were delighted with the belief that in the following winter the old trouble would not again arise, as nearly all the shippers had that year bought separators? It was with positive consternation that we saw in November and December of that year the difficulty was great as ever. The theory that age was the trouble was completely shattered, and we were without a theory as to the cause of the trouble.

About this time I learned, from a program of The State Dairy Association, that Governor Hoard, of Hoard's Dairyman, was to speak at the annual meeting. Having utterly failed in my own efforts to solve the problem, I resolved at once to attend the State meeting for the purpose of interviewing Governor Hoard. Before I had fully stated the case to Mr. Hoard he stopped me, saying he understood the trouble, and that he had been driven to distraction in his earlier experience by the same difficulty, and that he had known one cow to damage greatly the whole output of a cheese factory. "Your trouble," he said, "comes from some of your patrons milking cows that are so near the time of coming fresh that their milk is bad. One cow giving only a little milk will sometimes ruin the cream from the whole herd, and will greatly damage the whole of the product coming to a creamery." At this time about 40 per cent. of the cream received by me was being churned by itself because it was not good enough to make first-class butter, but this bad cream as it came from the shippers ranged all the way from almost good to very bad.

On coming home, a campaign was at once commenced on the lines suggested by Mr. Hoard. Letters were sent out to the shippers whose

cream was below standard. A gentleman who had had much experience in handling milk, and who possessed a discriminating taste and an educated nose, was hired to visit some of the dairies from which bad cream was coming. In every case this gentleman was able to find one or more cows whose milk was bad. In some cases the milk of certain cows was nauseating in the extreme. When the offending cows were taken out of the herd the cream would at once come all right. Soon, however, in some cases, it would get bad again by a new case coming up. Some of the cases were handled entirely by correspondence from the office. The result of some of this correspondence I will give.

A letter was sent to your honorable Vice-President, Mr. Macy, stating that his cream was not good, and asking him to test by taste and smell the milk from the individual cows of his dairy in order to find the guilty ones. Mr. Macy wrote back that undoubtedly we were mixing his cream with somebody's cream who was feeding ensilage, and we were blaming his cream for the fault of the cream made from ensilage. We wrote Mr. Macy that it was his cream, and not his neighbor's, which was bad. Several letters passed, but no improvement of the cream. At last on a certain day there was a note tied on Mr. Macy's can of cream. Without reading the note, the butter-maker and myself passed the cream for good, and this was the first time it had been rated good for probably a month. After judging the cream, I opened the note from Mr. Macy, which read about as follows: "I am feeding as good feed as I know how to feed. I am taking as good care of the milk as I can. I have turned all the cows dry that will be fresh inside of ninety days, and if this cream is not good I can not send you good cream." I wrote Mr. Macy that his cream was A1, and I never had any more trouble with his cream. One other case: A shipper who lives within less than a thousand miles of Mooresville was sending a little cream; it was a little after midwinter. The cream was exceedingly bad. He was written to that his cream was bad, and the probable cause was stated, and he was requested to test the milk from the individual cows and to dry off those making the trouble. He answered that I was right as to the cream being bad, as the family could not use it, but entirely wrong as to the cause. He said the trouble all came from white top in the clover hay, and that as his cows were almost dry he would discontinue shipping until April, when he would have fresh cows. The white top has just as much to do with making his cream strong as it did with starting the war with Spain. Enough of incident.

This taste is hard to describe, but once recognized will always be known. In a mild state it might be called an after taste. It is very disagreeable and pungent. By comparison it is more like the taste of an old strong walnut than anything else. I believe this condition never arises except in the case of cows that have been giving milk several months, but I am by no means certain that other conditions are not necessary for its development. I have not met the trouble in the summer, which indicates

that lack of green food may be a condition necessary to the development of this condition.

In my experience there has been much to indicate that the colder the weather the greater the trouble. Also much to indicate that the Jersey cow is an especial sinner in this line; no doubt, if this is true, it all comes from the fact that she is such a persistent milker. There is a wide difference as to length of time individual cows should go dry, and no doubt there are individual cows that will not develop this trouble at all.

Twice I sent out circular letters to all my shippers, describing the trouble, suggesting methods for locating the trouble, explaining the great loss from the bad product, and asking them to watch for the trouble and stop it, or avoid it altogether, before we were compelled to complain. Special effort was made to convince the shippers of the correctness and reasonableness of our position, and I am glad to say that the result of this campaign of education has resulted in practically removing the difficulty.

Up to date this year, we have had but two cases, the first occurring in a herd which had mostly been in milk since last March. This herd was dried up, the owner rightly thinking that the best possible solution. The second case came up within a week. Letters already written to this shipper will undoubtedly end this case.

I will offer the following general suggestions: The belief which has been so prevalent that the only good cow is the one which goes dry but a short time, or not at all, should be branded as the rankest heresy. The cow that will not go dry should be the first one sent to the butcher. Teach the producers of milk that the cow whose milk has dwindled to a half gallon or to one gallon per day is costing much more in the way of feed and labor than her product is worth; also teach the producer that the amount of milk given by a cow in the last ninety days before calving will in all probability be deducted from her next year's yield. Also teach him that often the buyer of his product is damaged by milk from such cows vastly more than the value of the milk she gives; also that his cow, because she has been so highly fed, in order to keep up her flow of milk, has become specially liable to an attack of milk fever, and I believe you will have taught some truths which will be of untold advantage to the producers of, dealers in and consumers of dairy products.

Dr. Woollen, of Indianapolis: I don't know what your custom is, but it is the usual thing in an association of this kind to allow visitors to participate in the discussion.

President Woods: Yes, the more talking the better.

Mr. Raab, of Marion County: If the cow goes naturally dry, there is some bad and some good cream. I have had some experience with that myself last year. We could not detect it, though, until the cream got sour, or ripened. After we kept those cows' milk out it was all right. One cow does the damage sometimes for a good many. Then another thing, when

the bran gets high they stop bran and feed nubbins, and if you feed all corn feed the milk will get strong; I have had that taught me by my own experience. If your cows come fresh in the fall, then you have good milk through the winter, and you have more of it, too; and then they will give good milk in the spring again when the grass comes, and it will make more profit out of the cows than if you have them to dry up in the winter and give milk only in the summer.

Mr. W. F. Drennen, of Philadelphia: I would like to express my satisfaction with the paper read by Mr. Furnas. I think it is one of the most valuable experiences connected with the dairy industry. I know it to be a fact from my personal experience, that there is probably no other one cause which is calculated to produce a bad product more than the one under discussion. A little personal experience, perhaps, will illustrate what I have to say better than anything else. Two years ago last March we entered the field at Delaware County, New York, for the purpose of getting a supply of extra print butter. You probably understand, some of you, that the style of dairying in that section of country has been exclusively summer dairying. The farmers, if they had any fresh cows in the autumn, sold them. We had unbounded success with the butter. Starting in the spring and going through the entire summer, we worked up a fine market, at from one to two cents above the highest quotation for print butter. When we got along to autumn we received some bad butter from some of those creameries that made such good butter during the summer. I immediately sent my men through that country, and an investigation was begun, and practically the same trouble was found as has been stated here by Mr. Furnas. We had to shut the creameries right down, and look elsewhere for our winter supply of print butter, which we found in Pennsylvania where the dairies are largely winter dairies. We succeeded in getting a sufficient number of fresh cows, last autumn, into the dairies, but not entirely, to remove the stripping element, and got along better. In the autumn of this year we had no trouble at all, because we succeeded in getting the stripping element entirely eliminated, and are now getting a very fine product from fresh cows. I think the subject is one of the most vital importance. I do not think you can talk about anything that is of so much importance as this matter of production of good cream, and, as I said before, we found the trouble as did Mr. Furnas.

Mr. Commons, of Centerville: I do not know that I can say very much on this subject. We have had some trouble of the very kind Mr. Furnas has mentioned, and we have found it necessary to go all over the territory to find where the trouble was, inasmuch as the separation was done at one central point, and not by the individual. We have had some trouble with frozen cream; outside of that, our principal trouble has been with cows that were milked too long.

Mr. Shaffer: If milk gets too cold, it has the same effect on it as getting too warm. Either of these conditions will prevent making good first-class butter, in my opinion.

President Woods: Would the thorough aeration of milk remedy this trouble?

Mr. Furnas: I can not speak from experience. I certainly think not. I have tried Pasteurizing it, and that certainly had no effect. The trouble we had, when it starts, goes ahead very rapidly. If on a certain Monday the milk coming to my place is a little bad, by the next Monday it has become so bad that we can not use it. In small herds one cow may make all the trouble.

Prof. Plumb: We have with us Dr. Van Slyke, from the New York Experiment Station, and he has given a good many years to the study and investigation of dairy problems. He is here to help us in our work, and it is possible he may have some special information on that point, and therefore I will ask him to say a few words to us, if he can, pertinent to this subject.

Mr. Woollen: Will the doctor allow me to ask him, if he knows, to give us an explanation of the physiological condition producing this state of affairs?

Dr. Van Slyke: I can not do it, because, so far as I am aware, nobody knows just exactly what the condition is. We know the chemical composition of milk, but we can not locate entirely the difficulties spoken of. For instance, the nitrogen compounds, casein and albumen, as a rule are present in larger quantities in milk from cows well advanced in lactation than in milk from cows in the earlier stages, and these compounds are the special compounds of milk most liable to undergo decomposition and give rise to disagreeable odors, but just to what extent this change in composition is connected with the formation of poor cream, nobody has been able to find out; but in my own mind I have no question but there is some intimate connection. For instance, I have noticed that as the cows get along to the ninth or tenth month, they may have as much as five or six per cent. of nitrogen compound in milk, while in the normal condition the milk has a smaller amount of nitrogen compounds than that. I have been very much interested in the statements that were presented to us in this paper, showing in a practical way, in commercial experience, what the experience has been, and how it has been met. We know that in a good many cases farmers are careless about the feeding of ensilage, and in some cases they feed turnips and other things that contain what we call volatile oils. The barn should be as free from odors of all kinds as possible at the time of milking, and such things as turnips should be fed with a great deal of caution. They should be given some time after the milking. We know from common experience that milk absorbs odors very rapidly. I was very much surprised, a few years ago, when I took a can of milk as soon as it had been drawn from the cow. I took it home, and

it was some hours before the can of milk was opened, and when it was opened there was a combination and concentration of all the odors that could possibly collect in the stable. It happened to be in the winter time, and at a time when the stable was not well ventilated, and the lesson was very strongly impressed on me in regard to the necessity of having the air of the barn just as free from odors of all kinds during the milking process as possible. Of course we have, in addition, as a source of contamination, the filth and the action of germs which always accompany filth. So we have the difficulty coming from the advance of lactation; we have it coming from certain kinds of food, or from anything that produces or gives impure air, or bad smelling air, in the stable. We have it coming from filth; so that we may have poor cream coming from one or all of these different sources. I might say that I have not looked into this question so much from the standpoint of cream production as from that of cheese manufacture. I suppose probably the cheese-maker is more troubled with these things than the butter-maker. The conditions which attend the manufacture of cheese have seemed to bring out and develop these things more, or at least some of them, in cheese-making than in butter-making, so the butter-maker may not have any trouble at all, when the cheese-maker is exceedingly annoyed. We have found the difficulty coming from all these sources. Then there is another condition which our friend, the veterinarian, may understand, but which I don't know as anybody has carried out so that we might say we fully understand it. That is, that there may be certain abnormal conditions of the cow which perhaps may not be classed as disease. We know that when a cow has been exercised, as by being chased by a dog, the milk produced under those conditions is quite liable to form a cream that will give off bad flavors; so I think we have quite a variety of sources to look to for this trouble.

Mr. Knox, of Boone County: I want to ask the professor one question, and that is in regard to this can of milk that he took from the barn. Was that can closed up tight when he took it from the barn, and did it remain closed?

Dr. Van Slyke: Yes. That is something that should not be done in practice, ordinarily, but I was very much struck by the fact that just as little of the barn odors as possible were allowed to get into it.

Mr. Knox: The fact of the can being closed would, if there was barn or foreign flavor connected with that milk, prevent its escape, and produce a bad effect.

Dr. Van Slyke: Yes. That is true.

D. B. Johnson, of Mooresville: With reference to the flavor in the barn, if the milk is warmer than the atmosphere surrounding it, will it take odor easier than milk which is colder?

Dr. Van Slyke: This thing has been tried at several experiment stations, and I think perhaps most frequently and most thoroughly at Wisconsin Experiment Station by Dr. Russell, showing that warm milk takes

on odors more quickly and holds them more persistently than does cold milk. If there is a bad odor in the barn. it can not be gotten out of the atmosphere too quickly.

GROWING MANGELS FOR DAIRY CATTLE.

BY H. E. VAN NORMAN, LAFAYETTE, TIPPECANOE COUNTY.

It is quite generally recognized that a food for dairy cows may have some value aside from that shown by chemical analysis. Its content of dry matter, protein, carbohydrates and fat may be low, and yet it may be a food peculiarly suited to stimulate the appetite, facilitate digestion and aid the bowels in the performance of their work. During the winter when the cow is confined to the stable and yard, and must depend on concentrated foods and cured fodders, hay, etc., she needs something in the nature of a "relish," much as her feeder enjoys cranberries with his chicken, apple sauce with roast pork, or cheese with his apple pie.

During this season when pasture is gone and prices for butter are highest, the dairyman who is seeking large production must have some succulence, in lieu of grass.

While silage is largely used as the substitute for green food, the successful handling of it requires a money outlay in machinery and storage room, not always available, even though the need is apparent and urgent.

The mangels, however, may be grown on most any farm, in quantities to suit the needs, requiring no special machinery nor building, may even be stored in a pit in the field, at a limited expense for time and labor. The soil for mangels should be well drained, well manured and in good cultivation. The more carefully it has been fitted, the better the seeding may be done. The two acres available this year at Purdue Experiment Station, which furnished us data for this article, were a good loam, underlaid with gravel from 12 to 24 inches below the surface. It was manured and plowed the last week in April. The roller, straight-tooth harrow and plank-drag were used in the fitting; the plank-drag was used last as it leaves a smooth surface for the drill, which in our case was a Planet Jr. hand garden drill.

Rows 30 inches apart, seed 6 lbs. per acre, sown May 3. One-half acre each of Champion Yellow Globe, Giant Yellow Intermediate, Golden Tankard and Mammoth Long Red. They were cultivated once with a spike tooth cultivator, then hoed and thinned. This was done by cutting out with a hoe, leaving a small bunch of plants every 10 inches. From this bunch the weeds and all but one plant were removed by the fingers.

This thinning was done when the plants were about two inches high. Too much emphasis can not be put on the necessity of having it thoroughly done, leaving only one plant every 10 inches. Inexperienced men are apt to leave two plants frequently. Neither one will make as satisfactory growth or shape as alone.

The plats received four cultivations, three of which were with a spike-tooth cultivator, and the last time a Planet Jr. with a chain dragging behind to level the small ridges. In addition to this the weeds in the row were cut out with a hoe, and later, a few hours were spent pulling out the large unsightly weeds which still survived. The aim was to keep the surface soil loose and conserve the moisture for the use of the plants. The importance of this may be appreciated when we realize that nearly 91 per cent. of the mangel is water. With a yield of 20 tons per acre, over 18 tons are water, taken mostly from the soil.

November 2, we commenced harvesting. With both hands the dead and dropping leaves were lifted and used to pull the root; then a twist or jerk dropped it in a windrow composed of three rows for convenience in picking up.

The numerous sprouts or suckers on some varieties increased the labor of pulling and topping very noticeably. The Giant Yellow and the Long Red were almost free from this objection. These two varieties were much easier to pick up because of the long neck-like top, instead of a flat top like the more spherical varieties. Some of these latter were too large and round to pick up readily with one hand.

YIELD.

	<i>Rate per Acre in Tons.</i>
Champion Yellow Globe	24¼
Giant Yellow Intermediate	25¼
Golden Tankard	17
Mammoth Long Reds	16½

COST OF PRODUCTION.

	<i>Number Hours.</i>	<i>Cost.</i>
Plowing and fitting, man and team.....	14	\$3 50
Drilling seed, man	7	88
Hoing and thinning	134	18 27
Cultivating, man and horse.....	14¾	2 80
Harvesting, man and team	34½	8 67
Harvesting, men only	67½	8 43

\$42 55

A total of 40¾ tons from two acres cost \$42.55 or \$1.04 per ton, while the largest yield was at a cost of only 85 cents per ton, allowing an equal amount of work on each half acre.

Woll in his book on silage, says, "Corn silage will generally cost \$1.00 to \$1.50 per ton, including seed, preparation of land, interest on same, cul-

tivation of corn, cutting, filling into silo, ready for use, and quotes figures from various sources varying from 58.8 cents to \$1.50 and even \$1.62 under New Hampshire's less favorable conditions than we have in the middle west."

He gives the comparative cost of an acre of corn in the silo and roots in the pit, as corn \$21.12 per acre, roots \$56.07 per acre. However, I think this excessive for the roots, as you have seen by my statement of the actual cost this year at Purdue.

As to the milk producing value of the two feeds, the Ohio Experiment Station found in four consecutive years the silage produced six per cent. more milk from the same amount of dry matter supplied from silage as compared with that from roots. This is interesting in view of figures from Maine, Pennsylvania, Ohio and Ontario, which show the dry matter produced in an acre of corn to be an average of 7,000 pounds, while the average in an acre of mangels was 3,000 pounds.

In Prof. Henry's "Feeds and Feeding," we find the amount of digestible nutrients in mangels to be as follows:

	<i>Per Cent.</i>
Dry matter	9.1
Protein	1.1
Carbohydrates	5.4
Ether extract	0.1

Notwithstanding these unfavorable comparisons with silage, the mangel certainly has a place in the dairy ration aside from its claim as a source of dry matter. An apple or an orange before breakfast does not add a great deal to our strength for the day's labor, but often it gives us a much better appetite for the more substantial dishes set before us.

So with the mangel for our dairy cows, in addition to a limited supply of milk-forming material, it has a palatability that makes it a valuable addition to the ration, especially in the absence of silage.

Dr. Woollen: I came here very largely to hear this paper. I have been interested in this subject and, like all of those present who own herds and are interested in herds, I want to know what foods are the cheapest and most beneficial, both in regard to the nutritive value and as to its value as a producer of milk and butter, and things of that kind. I have no silo, and the cost of one which a friend of mine built so terrified me that I did not consider the building of one until my good brother, Billingsley, helped me out of the trouble recently by some suggestions. I despaired of ever having a silo until I received those suggestions. But as the paper suggested here, it is very easy to produce these mangels, and I have been doing that for two or three years. I was greatly interested last year to hear a paper by Prof. Stone on beet sugar production, in the interest of beet sugar in Indiana, and a very careful set of instructions as to the

cultivation of the sugar beet, about the preparation of the soil and keeping of the beet covered. I had grown mangels, or had them grown, on the surface, and I don't know—I supposed, when I first began, that a mangel was a mangel, and I didn't know of these various types or kinds that are spoken of. I grew the big red mangels, the mammoth fellows that come out of the ground so much. I don't know them by any other name except just mangel. But I heard Prof. Stone insisting that the beet should be kept underground; that that portion of the beet above the ground had no sugar in it, and that the sugar would be a very important element in the food characteristic of the beet. It occurred to me one evening, without taking the time to look up the question, that it would be a good idea to bury our beets. In our last cultivation we hilled them and covered them as completely as possible, so that this year our beets have been grown under the ground very much more than formerly. Whether this helps them or not I do not know, but they look more solid and succulent, and have a good beety consistency or appearance; and look more appetizing. If I were a cow I think I would rather have those that come out of the ground than I would those that grow on top of the ground. (Laughter.) Some one suggested to me some time ago something about a root cutter, but I do not believe in cutting up these beets. They should be fed to the cows whole. If you do not think so, put a nice luscious beet in the manger and see the cow eat it, and see her downright satisfaction in picking it up and eating it. I would not deprive my cows of that satisfaction for anything. I would not have a root cutter if you would give one to me. Give them to the cows and let them have time to masticate them and eat them. The saliva can thus act upon them and render them far more digestible, just like the eating of a Florida orange or one of those old-fashioned apples makes us feel good, and wish we were boys again. But the point I want to call attention to is whether there is anything in burying these beets.

Mr. Van Norman: The mangel grown on top of the ground is much easier harvested. As to the increased food value of having them under the ground, I can not answer. A man will pull one-third more by weight where they are not under the ground. The labor of pulling them is quite an item, and whether the feeding qualities are enough higher to offset the increased labor of pulling, I can not say.

Mr. Billingsley: I grew three-quarters of an acre of sugar beets this year, and I desire to say a word in regard to the point made by the last speaker on the floor—the difficulty in harvesting or pulling them. I put two men out in the beet patch and they had been there a day and a half pulling beets, and when I went out to see about it they were not getting along very fast. It occurred to me that I could better that considerably, so I sent right to the barn and got a horse and plow, one of these little, narrow-tongued plows, and I went down one side of the row of beets about a foot deep, and we had no difficulty in pulling them after that.

Dr. Woollen: Do you hill them?

Mr. Billingsley: We cover them all except the crown of the beet, and it is pretty difficult to pull them without running a furrow along the row. We did that with a narrow-tongued plow, not more than two inches wide, as deep as we could put it in the ground, on one side of the row of beets. That relieves us from all trouble in the way of pulling them, and you can gather them as fast as you wish. Another word, in regard to feeding them. I fed my cows fodder and corn this fall and for some reason they did not do well. Our fodder did not do very well this fall, and so we were compelled to open the silo sooner than ordinarily on that account, and we are feeding beets yet, and our cows are relishing them well. I have grown beets and mangels before, but I prefer to feed the sugar beet.

President Woods: If Jersey cows eat the beets and like them so well, they should actually gain on their milk.

Dr. Woollen: We commenced feeding the beets soon after taking the cows off the grass. My brother is a member of the firm of Arthur Jordan Company of Indianapolis, and he tells me that the butter market has been very badly demoralized this season; that there has been very much less butter purchased than heretofore, and I have inquired of a good many, and I have found that they have had difficulty in making butter, and it is one of the questions that possibly might be discussed here this year at this Association. There has been considerable complaint about the production of butter, the quantity of butter this season, in the face of the fact that we have had so much rain and pasture. We have never had such fine pasture as this year, and we have had difficulty in keeping up our butter trade right along this fall, even when the grass was so fine.

Prof. Plumb: There is one thing I want to bring out, in connection with Dr. Woollen's statement about feeding the whole root. There are times when there is danger in feeding the whole root, because there has been more than one fine cow choked to death by endeavoring to swallow the whole root; especially have there been times that she has died because she has not been properly handled afterwards. That is really the chief object in cutting the roots. I stood by once, I remember, when I was a boy, and saw a magnificent cow choked to death by a root, and if I had known then what I do now, I would have known enough to save the cow.

President Woods: If you can tell how to rid a cow of a root she is choking on, it would probably be worth the while of this Association to listen to you.

Prof. Plumb: The best remedy I know of is to take a small wire, and grease the hand and arm well with vaseline or something of that kind, or oil, and carry that wire down with the hand as far as you can, and push it beyond the obstruction, and catch it, and draw it back. That is, assuming that it has not been carried beyond the point of dislodgement. People sometimes take a broomstick and, greasing it, push the ob-

struction into the stomach. That is oftentimes fatal, because there is danger of punching a hole in the wind-pipe, and thus killing the cow.

Mr. Raab: I have used a blacksnake whip, the big end of it. It is pliable, and I believe it is better than a broomstick or a wire, either.

ROOM ON TOP.

BY E. F. HANNING, EVANSVILLE, VANDERBURG COUNTY.

When one without any special work or trade looks about him before deciding on his life work, he is almost appalled by the overcrowded condition of the ranks in every vocation possible. Not only this, but thousands are standing about ready to fill up any gap or open space.

This condition of affairs is at first sight so evident that one almost feels himself a sinner for being on the earth, where he is sure to be in some one's way. Yet full as the ranks are, as close as competition is, as hard as the times are or have been, there is room in every line of work—room on top. The best is always in demand, no matter how glutted the market may be or how hard times may seem. We need only to look about us to see the truth of this statement.

Some men's products are always in demand, while others have a flourishing demand for a short time and then sink into oblivion, while still others fail to be in demand at all. The survival of the fittest is as certain as any truth ever spoken. That man who produces the best need not dread competition. Others with an inferior product may spring up and do well for a while, but never fail to be superseded by him who furnishes the best. Nowhere is this so noticeable as in the butter and milk world. Two men both in the same work and market; one sells all he produces and has demand for more, while the other finds the market glutted. One is on top, the other "nit." The one finds success in the pursuit of his vocation, the other a state of overproduction and discouragement.

Undoubtedly most of the dairymen here assembled have achieved success to a greater or less degree, and I am sure that all will testify that true success never comes unsought. It is through hardships to success. "No cross, no crown." There is no royal road to wealth. That's why there is room on top. Most men would like to get rich, but do not want to work for it; consequently we need pure food laws, poorhouses and penitentiaries. How to get a place in the roomy top is the question. To begin with, it is easier said than done. The test for one branch of industry can be applied to all. Take butter dairying for example. Never in the history of the dairy world was there a time so full of discouragements and at the same time encouragements as at present. Never was there

a greater demand for a first-class article, and still there never were so many spurious articles palmed off on the public as to-day.

He who would reach the top and stay there must remember that the first thing to be had is an A1 product, then a good reputation is almost as necessary, and last, but not least, perseverance. He who is just beginning should and must necessarily start at the bottom and climb upward. By giving the best, confidence is gained, a reputation naturally follows. A bright light casts its beams afar. A good product advertises itself, creates a demand; this demand, when met, is enhanced and grows. Then, by everlastingly keeping at it, success is certain.

The question of producing the best is the hardest to solve. In this age of discovery and invention, this age of machines, unless one is progressive and energetic, it does not take long to get behind the times. He who grasps opportunity by the foretop instead of its tail will always come out ahead. He who neglects to take advantage of the inventions intended to lessen the cost of production is being outstripped by the more progressive man. Not very many years ago butter men thought they had struck a bonanza when the Cooley creamery was introduced. What a labor-saver it was as compared with the old shallow pans and crocks. Then later the separator was brought out, till now a man can hardly claim to be an up-to-date butter maker without the separator, box or barrel churn, butter worker and printer, complete, with a small steam or gasoline engine to run it. Not only in the line of making butter after the milk is produced must there be progression, but in the production of the milk. Not very long ago, only a few of the most enterprising dairymen thought of silos and silage, or sugar beets, as a part of a cow's ration. Now, it is universally known that silage is a great feed, and shredded corn fodder is as good as the best timothy hay, while sorghum hay is one of the best and cheapest feeds known. Room on top; plenty of it. And he who is persevering and enterprising along all lines, stands first chance of occupying a place there.

Mr. Johnson, of Mooresville: I think the paper was well gotten up, and I want to mention that this everlasting stick-to-it-iveness is one of the main features that brings a man out on top.

Mr. Drennen, of Philadelphia: I never saw in our market a sufficiency of the fancy product. I think I can make that statement without reservation. I have been handling butter for the past twenty-five years, never did anything else, and I have never yet seen enough of the finest grades of butter to supply the demand, even at the extreme market price, or a little above that.

President Woods: In order to have good butter, it takes a little more energy and more brains, and the result is a better price.

FEEDING A LARGE DAIRY HERD.

BY W. D. WILLSON, OSGOOD, RIPLEY COUNTY.

Prof. Plumb: Mr. Willson writes me the following letter:

Osgood, Ind., December 12, 1898.

Prof. C. S. Plumb, Mooresville, Ind.:

Dear Sir—I find that it will be impossible for me to attend the Indiana Dairy meeting, and as you have me down for a talk or a paper on “Feeding a Large Dairy Herd,” I give you below my way of feeding, and if you think it of sufficient importance, you may read it to the Association:

I have on my farm about 430 head of cattle. I usually have about 300 cows in milk. I have silos that will hold about 3,000 tons of silage. I cultivate from 300 to 350 acres of corn each year, from which I fill my silos. Commence filling silos as soon as corn first planted is about matured, and fill as rapidly as I can with two feed cutters that will cut from 100 to 150 tons of silage a day until silos are filled. Corn is all the feed produced on the farm, except pasture and the straw from the wheat raised. I purchase such feeds as bran, gluten feed, malt sprouts and cottonseed meal in large quantities to feed with silage and make a balanced ration. I feed the cows in milk all they will eat the entire year. When they are on pasture they are fed in the stable as regularly as they are when they are not on pasture. Each milker has charge of 30 cows, which we call his herd. It is his duty to understand the capacity of each of his cows, to groom them, milk them and look after their comfort. He is required to do no other work, and if at times the work is too much for him, he employs an assistant. By buying so much of the feed used and carefully saving and applying all the manure, I find that my farm is increasing rapidly in fertility.

Very truly,

WM. D. WILLSON.

Prof. Plumb: I will open the discussion by simply referring, in just a few words to the way we do the work at Purdue. I hold that it is a first-class business principle to make a first-class thing in a first-class shape, and so if one is endeavoring to make butter or cheese, or turning out any other farm product, that in the first place there is not much danger of his taking too much pains in doing it, and in the second place when he does it that way he won't do his business any harm if he advertises it. That makes a good combination for selling. At Purdue, in the first place, the milker wears a white suit, a suit that you can buy for, in the neighborhood of, one dollar, and those clothes are kept clean.

When a man puts on his suit he goes to the milking, but before that is done, each udder is wiped off with a damp cloth and freed from everything that might possibly come in contact with the milk. So we will assume at the start, we have a clean cow, and a clean milker, and before that we have a clean stable. Then after each cow is milked by the milker, he washes his hands in a basin of water and soap, and wipes them with a clean towel, and he goes from one cow to the other with clean hands. Some people will say "that is being too particular," but do you know—I know you know, some of you—that within the past year or two, in some sections of our State, there has been a great deal of trouble from what is called ropy or stringy milk, or something of that kind. That is different from what Mr. Furnas referred to in his paper, because the milker at once recognizes that something is wrong. That can be conveyed from one animal to the other, and one of the easy ways to convey it is by means of the hands. It is an important item to keep the hands and feet clean, going from one cow to the other. I have had my attention called to that by some of our dairymen here in the State during the past two years, and it has been the cause of considerable trouble to them. They have lost the use of the milk of the cow, and it has spread among the herd, and this is an important item in taking care of the herd. The man that does our milking does it regularly. He has regular hours for milking, and we want nobody else to milk the cows unless conditions make it absolutely necessary. Of course, if the farmer has only four or five cows, then he can attend to them himself right along, but if a man is milking quite a large herd, as I know a number of people in this hall are, then under those conditions I would like to know what is the experience of those here, and I would like to ask Mr. Billingsley if he will not tell us how he handles his herd.

Mr. Billingsley: I have a small dairy herd. Our business is to sell bottled milk to the city, and it requires a good deal of patience and care to make it so we will have no complaints from our trade. In the first place, we provide for our cows. We make them as comfortable as possible, bedding them with clean straw, and giving them plenty of fresh water and food. We feed the cows according to their capacity, and this is one of the most difficult points I have found in getting men to feed properly, and I generally can not get it done without doing it myself or having my son do it. The men seem to want to feed all the cows exactly the same amount. But the fact is your cows differ greatly in the amount of food they consume, and each individual cow of the herd needs to be looked after just as carefully as though you have but one cow. I tell my men who are in the habit of milking, or if I employ a new man to do the milking—I tell him to always speak to the cows kindly, to speak to them as he would to his best girl, especially if he is a single man. There is very much in this thing of speaking kindly and softly to animals. We have scarcely any trouble in milking our cows. I think this is very largely

due to the fact that we treat them kindly. In feeding our cows silage we usually feed them after we have milked. There is a very great difference in silage. I have seen some silage fed to cows that we certainly would throw out in the manure pile. We feed altogether sweet food. We feed no brewers' grain or starch food whatever. For that reason we think our milk has an extra value on that account. We sell it at more than the regular price in the city. We require the man going to the cow first to brush off the udder carefully. We like to have them clean. We like to have them so that nothing gets into the milk in milking. I know it is customary with a good many dairymen to take the milk bucket and set it under the cow, without any examination whatever, and proceed to milk as rapidly as possible. There are a great many things that will adhere to the udder, especially if the cow lies down, and they drop into the milk bucket or are carried by the streams into the milk, and then it is practically impossible afterwards to strain them out. One of our customers said to me the other day that she did not have milk enough on Sunday, and she called on another dairyman and got a quart of milk, and she said it tasted absolutely so strong of the stable that she could not use it. That is not an uncommon thing. It grows out of the fact that you can not strain it out. You can not strain out these impurities. We take great pains in this particular in having everything as clean as possible. As soon as the milk is drawn it is taken directly to the dairy house. We give our stable good ventilation. I think you would not find any offensive smell there, even if you had a very fine sense of smell. It is taken direct to the dairy house and there we aerate it, and then bottle it and set it in the summer in ice water, and in the winter time in the cooler.

There were some remarks made this morning about the odor of milk taken from cows far advanced in lactation. This is one thing we are all the time testing. This morning, as I passed out of the dairy house, there were sitting on the shelf five tumblers about half full of milk, so that we may avoid milking any of those where we are likely to have milk that will be objectionable, and whenever there is the least smell, under those tests, that cow is discarded at once and set out to one side as a dry cow, and dried up as soon as possible. We may use the milk for a time for some other purpose, feeding calves, or something of that kind, but it does not get into the bottles, and it is not delivered to our trade, and since we have adopted this rule we have had very little complaint about milk that has an unpleasant smell or taste.

President Woods: I staid last night with Brother Billingsley, and I found things pretty nearly right down there.

Mr. Johnson, of Marion County: The question before us, as I understand it, is the handling of a large dairy herd.

President Woods: We will call it a medium one.

Mr. Johnson, of Marion County: I was paying more attention to the handling of a large dairy herd, and figuring on it, after hearing that short

letter, and I question in my mind whether it could be properly handled on that system—thirty cows to one man. I have thirty cows in my herd, but I am only milking eighteen at the present time, and one man does all the work. That is, he does the feeding and the milking. I sell my milk right at the barn to him, and he is to do the feeding and milking and to prepare the feed in the barn. At the present time, in order to get to his customers promptly, he gets up at from 3 to 3:30 o'clock in the morning. Now, to have that stable properly cleaned before he does the milking, is more than he can do, with the cows being kept in the stable over night. The first of the year we shall make a new contract, and put an extra man on, and do as I did last winter, before the milkman comes, the barn has to be thoroughly cleaned in time to have the odors removed by proper ventilation, and I found last winter that it was a great help to the morning milker to have the stables thoroughly cleaned before the milking commenced. This one man handling the eighteen cows, it seems to me, has about all he can handle, and attend to his customers as they should be attended to; and when it comes to putting thirty cows in the care of one man, I do not think that any dairyman can successfully handle his herd in that way; that is, if he is selling to a route man, or running the routes himself. That might do where you are wholesaling the milk to some creamery, where it is not necessary to have it there before 9 or 10 o'clock in the morning, or in time in the evening, or where it is only delivered once a day; then one man might possibly handle thirty cows. But, take it in a general retail dairy, about twelve to sixteen cows is about all I think one man can properly handle. In milking, where one man undertakes to milk thirty cows, I think I can put an extra man on, or even two, and milk those cows and get enough more milk to pay for their extra time. When one man has so many cows to take care of, he often gets in a hurry, especially if he has plenty of milk there, and he milks pretty rapidly, especially if he is behind time a little, and there is generally a good deal of milk left, and a few occurrences of that kind begins to teach the cow that she don't need to give as much as usual, and the result is they usually dry up a good deal quicker than if they are properly handled, and there is more time in which to milk them. I do not think that thirty cows can be properly handled by one man.

Mr. Sykes: I do not understand, in the letter, that this man did the milking of the thirty cows. As I understood it he just simply fed the cows and took care of them. They were his herd, and the milk was taken care of by some other party. Of course, milking thirty cows is quite a job, and one that is not a good strong man, with good strong muscles, is likely to get tired before he gets thirty cows milked. I have been there myself. I have milked as high as thirty-five at a time, but I don't want to follow it up very long. I think thirty cows are too many for one man to handle. We ship our milk to Chicago, and we have a class of people to deal with many of whom do not require a first-class article of

milk, and they would not know a first-class article if they would see it. We milk the cows and clean out the barn afterwards, but of course I realize that the proper thing is to clean out the barn first, and get the odors out before the milking is done.

President Woods: The train don't wait for you to do that.

Mr. Sykes: No, sir; we have to get up there to the train at half past seven in the morning, and if we wait to clean out the barn the train will not wait for us. It is a habit they have, I guess. I have had them wait for me when I would be down the road a quarter of a mile, and when I would be hurrying up to get there, but they don't make it a rule to do that.

President Woods: Tell what you feed the cows up in Lake County.

Mr. Sykes: My principal food is silage, and I raise practically all my own food, and grind corn and oats together. I feed according to the amount of milk the cow is giving. Most hired men like to give a certain ration to the whole herd. That is not proper. We have to educate our men not to do that, as much as possible, but when we are away we can not tell what they are doing. As a rule, I have had pretty good success getting them to do as I wanted. That is my way of feeding. If I am a little short of grain I buy a load of middlings.

President Woods: Don't a great many of them buy bran in preference to middlings?

Mr. Sykes: It depends on what I have to feed with it. I like middlings to feed with silage. I do not get the heaviest kind of middlings; there are different grades, I understand.

President Woods: Do you mix the middlings and silage together, or do you use them separately?

Mr. Sykes: I mix it together. I think it is better. I think they digest it and get the benefit of the food better. We have water in the barns, where the cows can get at it all times, and this water is not cold. I wouldn't know what to do without that. I have used that process of watering now about seven years, and I would be lost without it.

Mr. Van Norman: I was a little interested in visiting a dairy this summer where my father is. They are milking one hundred and forty cows, and in the matter of feed one man feeds the one hundred and forty cows in one barn. With a large feed cart he goes along on one side of the cart himself, with his assistant on the other, and with his eye on the assistant he dictates the quantity of food for each cow. They have a graduated scoop, which holds four quarts and in which he can measure out anything from half pint up. In feeding silage the herdsman would watch the fork of the assistant all the time, instructing him as to more or less feed. There were two men who pushed the cart. They had on, the day I was there, nineteen hundred pounds of silage on this cart, and two men pushed it along. I asked him about one cow, and he said she didn't pay for her feed. Another cow, he said, the more feed he gave her

the more milk she would give. There each man milks, grooms and cleans out the stalls for fifteen cows. The stables are kept clean. In one stable ninety-six cows were kept. The cows are kept in box stalls seven feet by ten. The feeder said that you could take any cow out of a stanchion and put her in a box stall and increase her daily flow of milk from half a pint to a pint and a half inside of three days on the same food, and he is very much in favor of it. Another thing, their feed boxes are arranged so as to turn up after the cow is through, and she can not smell it again until time to feed, and that way the dirty dishes are not left standing around from one meal to another.

Mr. Hoadley, of Carroll County: I would like to say a few words, not in regard to feeding a large dairy herd, but feeding as large a herd as possible and maintaining as large a herd as possible on my farm, which contains only eighty acres of land. I went into the dairy business about six years ago, and it was my aim at that time to increase my herd and maintain as many cows and as good cows as possible on that farm. I found, four years ago, when I commenced feeding silage, that I could only keep about twenty head of cattle, with the horses it required to grow the crops, and by forming a system of rotation I could grow the crops, and grow all the feed, and now at the present time I have forty-one head of cattle, including calves, and yearlings, and two-year-olds that will be fresh next year. I have twenty-two head of cows, and the remainder are young stock, and I find no trouble in handling that amount of cattle on eighty acres of land, very much to the surprise of some of my neighbors, and I intend to keep on until I can keep a cow for each acre of land. I cultivate forty-eight acres of land. I saw a farm in Pennsylvania of forty-three acres that maintained forty-three head of cows, and I came home from there with the determination to maintain forty-eight head of cows on forty-eight acres of land. The remainder of the farm is for pasture. We have a small wood lot, which produces some grass, and we grow soiling crops in the summer. We grow green clover first, then oats and field peas, then sweet corn and silage; but next year we intend to have silage enough to feed almost the year round. Our cows are out on pasture in the summer, but we do not attempt to allow them to graze on land that has not good pasture on it. We simply get the feed and haul it to them, and fix it for them in such a way that they can eat it and not have to use up their energy in walking around over the land to find something to eat.

President Woods: Mr. Hoadley, of course you intend to buy bran or something of that sort to feed your cows when you try to have one cow for each acre of land?

Mr. Hoadley: We feed very little, if anything, except what we grow on the farm, excepting a little clover hay.

President Woods: You use the clover hay to make the balance of the ration, with silage?

Mr. Hoadley: We use clover hay morning and noon, two feeds all through the year, and at night we feed the amount of ensilage we think proper for the cow, which is about thirty pounds.

President Woods: Don't you think it would pay you to feed some bran or grain ration with that feed?

Mr. Hoadley: We do not feed a grain ration on an average four months in the year.

President Woods: Don't you think it would pay you?

Mr. Hoadley: No, sir. It would if you lop the clover hay off; and if your hay was not properly cured and cut, but I find that I am not reimbursed for the money I pay out for the bran; I don't get that back.

President Woods: What do you seed your clover with?

Mr. Hoadley: With wheat.

President Woods: Do you have good success in getting a stand of clover, seeding it with oats?

Mr. Hoadley: I don't grow oats.

Mr. Billingsley: What is your experience in cutting ensilage? What time do you cut it? A few years ago we were recommended to cut it when it was quite green, and we have had some experience along that line. I would like to know how near in accord we are in regard to the maturity of the crop.

President Woods: Has that neighbor of yours opened up that silo yet?

Mr. Billingsley: Yes.

President Woods: Did it keep?

Mr. Billingsley: I can't say, for the reason I did not get to see the silage. He says it is all right, but whether he knows or not is another thing.

President Woods: We visited a neighbor of Mr. Billingsley who was putting up silage, and I said it was entirely too dry; it was as dry as shock corn taken out of the shock, and I predicted it was too dry, and it would not keep, and that if it did, it beat anything I ever saw.

Mr. Sykes: I have had several years' experience with silos. You want to let the corn get as ripe as consistent, so there is plenty of moisture there, so it will cook without burning, the same as a kettle on the stove must have moisture in it to prevent what you are cooking from burning. You must have water enough in the kettle to prevent its burning. The same thing is true of the silo. You must have enough moisture there to prevent its cooking when it goes through the fermenting process. I have never had that experience myself, but I have known a number of others who have put up silage, and it became acid and sour, and they had trouble with it, and the stock didn't appear to do as well on it, and there were complaints from the dealers in the cities that the milk was not good, and I could not attribute it to anything else except that it was sour.

President Woods: Did you ever try wetting down the silage as you put it in?

Mr. Sykes: No.

President Woods: Do you wet down the silage to the walls?

Mr. Sykes: No, the walls are apart, and it don't appear to dry out, and it is not necessary to wet it.

Mr. Billingsley: This is the fifth year I have put up silage. The first year I cut it quite green; and as the gentleman said who was last on the floor, it was too acid; it didn't give me the satisfaction that I have had in feeding silage that is better matured. The last two years I have cut and filled my silo at a time when the corn was ready to cut and put in the shock. In fact, one year we did both at the same time. I have wet down silage; I did one year wet it down. I have found no particular advantage in doing it; neither was it any disadvantage, so far as I know. If I had put in corn that was very dry, as my neighbor put it in, which was referred to by the President, I would certainly have wet it down, that is, if the corn is quite well matured, ready to go into the shock almost—I would perhaps want three or four days the advantage for the silo. I was asked at a Farmers' Institute last winter in Madison County how this silage should smell, and I said it should smell very much like an old rum barrel, and a lady who was present thought perhaps there was some objection to silage on that account. (Laughter.)

Mr. Johnson: I believe there is a good deal of importance in this matter of putting up silage at the right time. I agree with Mr. Billingsley upon one point, and that is about smelling like a rum barrel. I agree with him that there is a time for cutting silage. We have had about eleven years' experience in silage, and we have found that our corn gets in proper condition to put in the silo just before you put it in the shock, and we hire our hands for both operations at the same time. We first fill the silo, and then put the balance in the shock. We like to begin just about the time the cane sugar in the stalk has turned to starch, so it won't make an acid silo, and it is very fine and smells good enough to eat.

Mr. Billingsley: I have two silos. My silage keeps much better in the tub silo. In the square silo I find difficulty in the corners about it keeping, and it sometimes spoils out from the corner two or three feet, in a pocket like, and we can not account for it, but in the tub silo there is no difficulty of this kind.

President Woods: You can not pack it closely in the corner, and the air gets down and works into the silage.

Mr. Billingsley: I think it is almost impossible to build a square silo and make the corners' air-tight.

President Woods: I put a board across the corners and fill back of it with sawdust, but still there is the dry silage in the corners. We generally husk our corn and put in five or six big loads on top of husked corn, and then wet it down and stamp on it. This year there was so much rain that we thought it was not necessary to wet it down, and when we came to open it up it had dry mold on top further down than usual. It should

be wet on top and stamped down good and then it will be less apt to decay and spoil.

Mr. Johnson, of Marion County: I have heard this discussed from year to year, and it is constantly being experimented on. I have never found any one who was discussing it five years ago that is discussing it to-day on the same line. They are trying experiments. I have never seen it demonstrated to my mind thoroughly enough to build a silo. I heard a discussion at Lebanon two years ago that convinced me more thoroughly than anything else in regard to a silo. My plan of preparing feed is to take the fodder corn, drilled quite thick, and get it out at the proper time and cure it and put it in the barn, and then I take good, bright clover hay and put it together, and put it in the tank as you feed it, wetting it thoroughly and mixing my ground feed with it, and I think I have just as good a feed as you have out of the silo. I have a record here of my dairy for the last twelve months, which I will be glad to produce, and if any one can beat it with a silo, then I am convinced that a silo is the proper thing.

President Woods: The only trouble with your business is that you have done too much work to get it.

A Voice: That's right.

Prof. Plumb: I would like to ask how many people in this room have silos? I count seventeen. I would also like to ask how many people in this room who have used silos for at least three years, and with satisfaction? I count seventeen. I think that is a good record, because the silo has had a slow growth in this State.

On motion of W. S. Commons, of Centerville, seconded by Prof. Plumb, the chairman was instructed to appoint a committee of five members to select names for officers of this Association for the coming year, said committee to report at the afternoon session.

Prof. Plumb: The Indiana State Dairy Association has come here to Mooresville as a compliment to Mooresville, and to bring the gospel of good dairying as much as possible into this community. There are a good many people here from other towns and various parts of the State. The Indiana State Dairy Association has been growing for the last few years. We do not want to have it go away from Mooresville any weaker than when it came here. We want to go away from this town with our membership list largely increased. I am sure we will have a crowded house this afternoon and to-night, and a first-class meeting. It takes membership to make a success, and the State of Indiana needs considerable of push along dairy lines to get at the head of the procession. There are many things to be done. We print each year the proceedings of our annual meeting. We have a book of two hundred and four pages, with all the addresses and discussions of last year, run off by as good a stenographer as we can get in the State of Indiana, and that in itself is worth more than the membership fee. You get a great deal of good in meeting one another and coming into social contact. We have got to do something

to put Indiana on a plane with other States in relation to pure food products. The Dairy Association has a mission to perform. Our dairy law in the State of Indiana is a shame, and Indiana has become a dumping ground for adulterated foods. Other States are protected from these. We are not protected in any way. This Association has work to do, and the members of this Association are the ones to do the work. We have now in the neighborhood of one hundred and thirty paid members, and by the next annual meeting I want the Secretary to be able to report two hundred and fifty.

Mr. Johnson: The ladies have prepared a dinner, and, while Mooresville does not have the largest hotel capacity in the world, yet we have some of the best cooks.

On motion the convention adjourned at 12 o'clock, noon, December 14, 1898, to meet at 1:30 p. m.

President Woods called the convention to order at 1:30 p. m.

President Woods: I will appoint the following Committee on Nominations: W. S. Commons, of Centerville; O. P. Macy, of Mooresville; J. J. W. Billingsley, of Marion County; Arthur Hoadley, of Carroll County, and John Shugart, of Grant County. Prof. Plumb will now read his report as Secretary-Treasurer. (Report appears in back of these proceedings.)

Prof. Plumb: I move that an Auditing Committee of two be appointed. Motion seconded and carried.

Prof. Plumb: Mr. Frank Johnson has brought here to show this audience a silver cup given by the Marion County Agricultural Society for cheese, which was awarded to Mahala Howland, his grandmother, before any State Fair was ever held in this State. It is a sterling silver cup, and so far as I know, it is one of the earliest premiums ever awarded in Indiana in any such class. Then here is another cup which was given to Mary E. Johnson, Mr. Johnson's sister, by the State Board of Agriculture, for exhibit on cheese, and is inscribed, "Fifth Indiana State Fair Premium, 1856." Then here are three types of spoons, a sugar spoon and a little ladle and a soup spoon, and these were given for cheese, and were given by the Marion County Agricultural Society, and given prior to the State Fair, given to Mahala Howland. And then here are three teaspoons that were given by the Indiana State Board of Agriculture in 1851 for cheese, to Mahala Howland, at the first State Fair that was held in Indiana.

SOME OF THE UNSOLVED PROBLEMS OF DAIRYING.

BY L. L. VAN SLYKE, PH. D.

Chemist of the New York State Agricultural Experiment Station, Geneva, N. Y.

It has been my custom, when addressing a body of dairymen like yours, to present the results of some special research work, confined to

some limited portion of the field of dairying. It occurred to me, however, that for one of the addresses to be given before your Association at this annual convention, it might be more desirable to depart somewhat from my usual custom, and to take with you a rather general survey, covering what has already been accomplished in the various lines of dairying and making prominent what remains to be done before we come nearer our ideals.

We will, as it were, take an inventory of our stock of knowledge of dairy science and practice, and thus ascertain in what lines we need to fill up, in order to make our stock more complete. It is helpful and often encouraging to find out just what we really do know and what we actually don't know. The line of division between these two territories is often uncertain, and varies much in the sight of different individuals. Some individuals know a great deal that isn't so.

The doctrine of expansion, which is now thick in the air, has been applied for some years already to the realms of dairy knowledge. Each year is adding materially to the things we actually know. At no time in the history of the world has there ever been so great activity in all lines that relate to the science and practice of dairying as during the past ten years.

I will speak first of that branch of dairying of which I have least knowledge experimentally, but which is fundamental in its importance. I refer to breeding.

BREEDING.

Generally speaking, I suppose it is safe to say that in no line of dairying has the best practice advanced in the past half century so little as in that of breeding, for the reason that no other line had been so much developed previously. It would be untrue to say that our knowledge of the science of breeding has not advanced, for we know much more now about the whys of breeding than we once did; but this knowledge has served rather to explain why successful breeders secured good results than to work any revolutions in those methods. I do not mean to be understood as saying that no more dairymen are using better methods than formerly, but that there has been no great revolution in successful methods, giving greater success than the best methods previously employed.

Again, I suppose it is safe to say, if I may judge from what I have heard in conversation with different individuals, that in no line connected with dairying is there such variation of opinion in regard to the details of successful methods. Very much lies in the border land between the known and the unknown. There are a great many half truths, which are too often taken for complete truth. We know that it is easily possible to control the character of offspring and to direct it along certain lines that are suited to certain more or less special purposes. We also know

that we have not yet complete control of all conditions and we can not be sure of definite success until we do.

Many explanations or theories have been put forward to show how and why tendencies and qualities are inherited; but not a single one of them can be regarded as anything more than guesses, varying in their degree of wildness. It is altogether probable that we shall never know satisfactorily.

The control of sex has probably attracted more attention than any single point in breeding. To illustrate the general statements preceding: While many claims have been put forward from time to time that the problem had been worked out, these have all been disappointing, when carefully and extensively tested.

Within the past year a German investigator asserts that he has succeeded, and, while carefully avoiding details, he states in a general way that sex is governed by the character of the food eaten by the mother during the period of gestation. This precise claim has been made before. This is at present an unsolved problem, and no one can tell how long it will remain so.

In addition to these very general statements, I wish, in passing, to call attention to a possibility of future breeding, as pointed out by Prof. Jordan, formerly of your State, now President of the Leland Stanford University, in an address given before the California Dairymen's Association. I quote from a report of his paper: "The egg of a cow," he said, "is essentially like the egg of a hen, as all eggs are merely cells. The nucleus of the cell contains the architect's plan for the whole animal. Now, if the nucleus of a cow's egg could be taken out and substituted for the nucleus of a hen's egg within the latter egg, there would be no difficulty, with proper means of development, in hatching cows from hens' eggs." The report says that this sublime proposition called forth loud applause, and visions of untold wealth at once arose before the eyes of the astonished dealers in milk and cream. Several immediately began figuring out what increase they might expect in their herds from the present stock of chickens. On an ordinary farm having two hundred chickens, which average one egg a day, a collection of five days would aggregate one thousand hens' eggs. Then the cow's eggs could be transferred to the hens' eggs and a sufficient number of hens selected to cover these eggs. At the end of three weeks these faithful hens would have hatched out one thousand calves, which, at three dollars each, would represent a profit of three thousand dollars. The dairymen were dazed at the greatness of the scheme, but were called down from their high flights by President Jordan remarking: "I do not think this will lead at once to a revolution of the industry, but there is no theoretical difficulty in the way, and fully as wonderful things have been done." It would appear from this that we have much yet to look forward to in the line of future changes in methods of breeding.

FOODS AND FEEDING

Great advance has been made during the past generation in regard to our knowledge of food, its uses, functions and adaptations. We know that foods perform certain definite functions in the animal body; that they furnish the material necessary to repair the losses sustained by waste of tissues; that they supply material for new growth; that they give the fuel needed to maintain the animal body at a temperature suited to its working requirements; that they furnish the body with strength or power to do work; that they enable their nutritive parts to circulate through every portion of the body and thus supply to each what is needed. I say that we know these things. Once they were wholly unknown, but are now solved problems.

We also know that a food, such as corn meal, for example, is a mixture of several kinds of compounds, known as nutrients. Thus corn meal contains some water, some protein or nitrogenous material, some carbohydrates, some oil, and some mineral constituents represented by the ash. We also know to some, but not the full, extent what use is made of each kind of nutrient. For example, we know that the special duty of protein, under which term are included several different compounds, all containing nitrogen combined with other elements, is to repair waste tissues and grow new ones, such as muscles, nerves, tendons, skin, hair, etc.; also, in the cow, to furnish the material out of which are made the casein and albumin of milk. Protein also furnishes some heat and working power.

Carbo-hydrates include sugar, starch, gums, fiber and similar compounds. Their special purpose or function is to furnish heat and working power, and also more or less material for the production of fat.

The fat or oil contained in foods can be used to furnish heat and strength or working power, and also material for building fatty tissues.

The use of water is to render the fluids of the body sufficiently diluted to circulate with ease, and also to form an essential part of all organs and tissues. The water in animals and foods, though held in the tissues in such a way as to be invisible, is just plain, common water, like that drawn from a well, excepting for impurities in the latter, and performs the same functions in the animal body.

The ash is largely used in making bone.

These general facts are familiar to you and are among the solved problems pertaining to the composition and functions of foods.

Now, what are some of the unsolved problems in this field that have a special interest for the dairyman?

One such problem of high scientific interest and also of practical importance in dairying concerns the food source of formation of milk fat. Where does milk fat come from?

The most common popular belief is that milk fat comes from the fat or oil present in the food eaten, and that the animal simply collects and

transfers the food fat into body fat or milk fat, or both. This belief has had some foundation. In some exceptional cases it has been possible to account for all the milk fat by the food fat. In some cases it has been possible to change the composition of the milk fat by changing the kind of food fat. Thus, it is commonly held that cottonseed meal makes a harder butter, changing the composition of the milk fat; on the other hand, that linseed meal so changes the composition of milk fat as to produce a softer butter. We are not yet fully justified by facts in accepting these statements without some qualification. The conditions under which such effects have been obtained require further study.

Again, it has been thought the transformation of food fat into milk fat is the most natural process to expect to occur.

But we must remember that the same kind of food eaten by different animals furnishes animal fats which differ very essentially, as lard, tallow, mutton fat, milk fat, etc.

It has been claimed that milk fat is formed from the protein of the food. It is conceivable that it might be, but the experiments upon which such a belief is founded were carried on with other animals than the cow and had little or no reference to milk fat. In my judgment, there are no experimental data which justify us in believing that milk fat necessarily, under normal conditions, comes from protein. Such a belief has had the effect of causing many to feed highly nitrogenous rations.

There is unquestioned proof that milk fat is formed from starch and sugar foods, or carbo-hydrates.

Director Jordan of the Geneva (N. Y.) Station has been carrying on an experimental study, bearing on this particular question, the source of milk-fat. A ration from which the fat had been nearly all removed was fed a cow ninety-five days, and her milk continued similar to that produced when she was fed on the same kinds of hay and grain in their normal condition. During the ninety-five days the milk contained 62.9 lbs. of fat. The food eaten during this time contained only 11.6 lbs. of which only 5.7 lbs. were digested; hence, not less than 57.2 lbs. of the milk-fat came from some other source than the food-fat. It might be suggested that this milk-fat came from fat previously stored in the body. Three lines of evidence show that this could not have been the case.

(1) The cow's body could have contained scarcely 60 lbs. of fat at the beginning of the experiment. (2) She gained in body weight 47 pounds with no increase of body nitrogen, and was judged to be fatter at the end. (3) The formation of this quantity of milk-fat from body-fat would have caused a marked degree of thinness of body.

The milk-fat may have come from the protein, it is suggested. It could not have done so, because there was not enough protein taken in the food to produce more than 17 lbs. of fat, allowing that all the fat possible came from protein. The quantity of milk-solids bore no definite relation to the digestible protein eaten or decomposed in the body.

The composition of the milk bore no definite relation to the amount and kind of food consumed.

The only possible conclusion from this carefully conducted investigation is that the milk-fat came, at least in large part, from the carbohydrates. In view of these facts, it may be supposed that the well-known favorable effect upon milk secretion of a narrow nutritive ration is due in part to stimulative, and not wholly, to a constructive function of protein.

Another problem, closely related to the foregoing, which still remains a source of contention, is in regard to controlling the per cent. of fat in milk, particularly with reference to increasing it. While the results of investigation have varied somewhat, we must confess that, so far as our present knowledge goes, we know of no authoritative experimental evidence which would justify us in believing that the per cent. of fat in milk can be increased under normal conditions and in an economical, practical way by any change in the character or amount of food nutrients. The investigation of Prof. Jordan did not reveal any marked changes in composition of milk even when marked changes were made in the character and composition of food. And yet there is no belief that is more tenaciously held by milk producers. Of course, no one can now say with absolute positiveness whether this problem is one that admits of possible solution. We have not yet solved it.

Among other problems, partially solved at least, connected with the feeding of dairy animals is the one relating to the mixing of food nutrients. We know that we can secure desired results most economically by feeding protein, carbohydrates, etc., in proportions that are approximately definite. To say that we know exactly what those proportions are is claiming more than we know with positiveness. We know roughly and should work within limits not too wide apart. To say that we must always have our food mixture or ration contain exactly 5.4 parts of carbohydrates, etc., for one part of protein is claiming too much. We know that there may be quite wide variations from this standard with equally good or better results. It is highly desirable, it is the only way, to feed according to definite principles, but our application must not be too narrow. I am free to say that I regard it as a species of humbug for anyone to make one ration for a Jersey cow, another for an Ayrshire cow and still another for a Guernsey cow, when the object is in each case to produce milk-fat. The use of a feeding standard must always be accompanied by common-sense observation of the herds and even individual animals we are working with, if we expect to secure most economical results. The tendency has been too much in the direction of regarding a fixed, definite standard, universal in its application, as a solved problem.

To a layman, it may be a matter of surprise to learn that chemical methods for determining the actual food constituents of our feeding stuffs are very far from complete. It is commonly thought that a chemist can tell everything imaginable about a food after making an analysis, but this

is as yet an "iridescent dream." For example, we have as yet no satisfactory method for determining the amount of fat or oil in a food. What we commonly report as fat or ether-extract is very impure fat. Then, of the different compounds embraced under the term protein, we have a kind of separation into albuminoid and amide compounds, but it is desirable to go much farther than this, which we can not well do at present. The determination of carbohydrates is still a matter of study and experiment, though much progress has been made within five years past. What chemical analysis can now accomplish is helpful, but it suggests how much more there remains to do in this important field.

Ten years ago it was thought that a method had been found by which we could determine closely the digestibility of the nutrients of a food. Artificial digestion became a kind of "fad" in laboratory investigations, but the method was found to be unreliable in many details, and its results very variable in the hands of different workers. It was found that a great variety of conditions affects the digestibility of a food, so that actual digestion and artificial digestion too often gave results very wide apart. There has been not a little difficulty caused by actual digestion experiments improperly carried out or by drawing sweeping conclusions from the use of two or three animals.

We have reason to feel greatly encouraged by the marked progress made in the methods of study of all that pertain to food and feeding, but we must not make the mistake of closing our eyes to the fact that very much remains to be learned before we can say that there are no unsolved problems in this field.

MILK SECRETION.

There is probably no operation taking place within the cow that possesses for the dairyman more intense interest than that of milk-secretion. How does the cow make milk? The question has been studied from its chemical, physiological and histological standpoints. Very much of the study has resulted in finding out things that are not so. Each investigator has shown that the theory held by his predecessor was incorrect and has set up his own theory, which in turn was knocked down to be replaced by another. About no function have there been so many different explanations as about that of milk-secretion.

Your secretary, Prof. Plumb, has published a most valuable bulletin on this subject and I feel that any detailed discussion on my part here is not called for. Some things we may regard as fairly well settled. My purpose is mainly to summarize briefly what we do not know yet.

Originally it was held that milk is simply blood filtered through the mammary glands, and that, therefore, the amount and quality were determined solely by the amount and quality of food. As a matter of fact, not one of the organic constituents of milk occurs ready formed in the blood, but they are all formed in the milk-gland.

A study of the detailed structure of the udder demonstrates the important fact that the difference in the milking qualities of different cows is principally due to the inherited individual characteristics; in other words, the cow's capacity for milk production is limited and determined at her birth. It may be stated with considerable certainty that we know just where the fat globules are formed, with much less certainty where the casein is elaborated and still less, the sugar. We do not know to what extent the constituents of the blood,—the fat, the protein compounds and the carbohydrates,—are utilized in the formation of the organic constituents of milk. Even less do we know anything of the details of the changes that take place in the materials which are converted into the constituents of milk. A recent article on this subject says in regard to the formation of fat: "Fat formation is the expression of a quite specific adaptability of the living protoplasm of the milk-cells," which is equivalent to saying that we don't know much about it. The chemical details of milk-secretion are in all probability among the problems that do not admit of a final solution.

The question as to whether milk lies in a ready formed condition in the udder, or whether a part is formed through the excitation of the nerves connected with the milk-secreting organs during milking, in consequence of the withdrawal of pressure in the udder must still be regarded as unsettled.

COMPOSITION OF MILK AND ITS PRODUCTS.

Taking up, next, what we know and don't know about the composition of milk and its products, we can congratulate ourselves that we know much more than did the preceding generation, and we are making rapid additions to our knowledge each year; and yet enough remains to keep a lot of chemists busily employed for many years to come.

Not many decades ago, our knowledge of the composition of milk was limited to this: Men were led, from common observation, to believe that milk contained three constituents: (1) Fat, which separated as cream and could be made into butter; (2) curd, formed by the souring of milk, and (3) whey or serum, the thin liquid portion left after coagulating and separating the curd. We have improved and extended our knowledge beyond the foregoing facts. We know that milk is made up of numerous compounds, some of which are very complex in composition and structure.

WATER.

The constituent of milk which is present in largest quantity is water. This may vary from below 85 to 89 lbs. for 100 lbs. of milk. The average is not far from 87½ lbs. We know that the amount of water in milk is influenced by various conditions, such as breed, individuality, stage of lactation, kind and quality of food, health, care, etc. While we can to a limited extent, control the amount of water in milk in entirely legitimate

ways, we are very far from doing so completely. For example, we can not, by normal means, make a cow, born to give rich milk, produce poor milk, that is, milk containing much water, and I have yet to learn that the reverse operation has been accomplished successfully.

FAT.

It was formerly supposed that milk-fat was a simple, single compound, but we now know that it is a very complex mixture, containing glycerine united with a half-dozen or more acids, combinations, some of which are peculiar to milk-fat. This much we think we know about the composition of milk-fat. But we know little as yet about the details of how this mixture of compounds contained in milk-fat is put together. Much work has been done on this problem. Its solution is of practical importance, because the knowledge thus gained may aid further in the solution of the other problem, how to control the composition of milk-fat.

We know that milk-fat varies more than any other solid constituent in milk, varying in different cows and in that of the same cow. The last few years have added much to our knowledge regarding the relation of milk-fat to its two products, butter and cheese. The amount of fat in milk enables us to tell, within narrow limits, how much butter or cheese should be made from any given quantity of milk. We do not have to make butter or cheese, in order to know how much a given milk will produce, provided we know how much fat the milk contains.

These facts place before the dairyman another definite problem which each must work out for himself. He is furnished with a working basis such as he has never had before. The problem before each dairyman, who produces milk for butter or cheese and who labors for the highest success is this: How to produce, not quantity of milk alone, but increased quantity of milk-fat. Hence, the problem to be solved is the production of fairly rich milk, if larger money returns are to be secured. A more detailed consideration of this question falls naturally under the subject upon which I shall speak to-morrow morning.

NITROGEN COMPOUNDS.

Another class or group of important compounds present in milk is known under the general term of nitrogen compounds. Formerly, it was supposed that there was only one of these compounds in milk, and it was called casein. While casein is the most abundant of these compounds in milk, there is at least one other, albumin, and, perhaps, a third.

Casein is the most important nitrogen compound of milk from the fact that it is the basis of the cheese-making industry. It may seem strange, but it is, nevertheless, true, that the composition of casein is still an unsolved problem. It can not be said with certainty whether it is a single compound or a mixture of two or more compounds. Exactly in what manner rennet and acids affect casein, when they coagulate it, we are not

sure. One chemist's life devoted to a study of this single substance would be regarded as most successful, if a satisfactory solution of these unsettled problems could be reached.

The question has been raised whether we could not hold in cheese all the nitrogen compounds of milk, the albumin as well as the casein. It would be possible, but it has not been found practicable to retain albumin in our ordinary American cheese. There is made in Wisconsin a product which resembles cheese and in which are retained all the solids of milk.

From this superficial and hasty review, it will be seen that, however much has been accomplished in advancing our knowledge of the composition or value possessed by that made from normal milk.

Similarly, our knowledge of the composition of butter and cheese has very greatly increased, even in the last five years, but we are very far from learning everything.

CHEESE RIPENING.

In regard to the detailed chemical changes that occur when cheese undergoes the remarkable transformation known as ripening or curing, we know something, but only the ABC as yet. Within the past year and a half has come a fundamental discovery in this field.

It has been universally believed that the breaking down of casein in cheese ripening was due to the action of lactic acid germs. This breaking down consists of a change from a rubber-like, indigestible curd to a soft, mellow, and digestible condition. This action is now believed to be due to the presence of ferments or enzymes which are present in the milk as it is produced by the cow. These enzymes are known as unorganized ferments, like rennet, as distinct from germ or living ferments. Drs. Babcock and Russell, of Wisconsin, reported this discovery and have been engaged in studying the enzymes of milk.

These enzymes exist in different quantities in different milks, and are probably influenced by a variety of conditions which remain yet to be studied.

We believe that we know pretty thoroughly the relations that exist between the composition of milk and the composition of cheese, so fully, indeed, that, from knowing one we can approximate the other. We know, for certain, that skim-milk can not make a cheese of the same composition or value possessed by that made from normal milk.

BABCOCK METHOD OF DETERMINING FAT

One of the most important problems, if not the most important, that has recently realized a complete solution is a simple method of determining the amount of fat in milk. For years dairy chemists had been seeking to devise simple means for solving this problem. It remained for Dr. Babcock to find the best solution. This has placed in the reach of every

dairyman the means of finding out his mistakes; it has made possible for every dairyman the independent study of many dairy problems; it renders the dairyman capable of acting in his own defense; it gives a working basis, a guide, and a final arbiter of success. It makes possible the solution of practical problems, whose solution would otherwise be impossible.

ADULTERATIONS.

A few years ago dairy chemists were confronted by a most serious problem, that of detecting imitation butter. The problem was solved, and the successful execution of laws looking to protection against imitation butters has depended upon its solution.

More recently the problem of distinguishing skim-milk from whole-milk, and skim-milk cheese and filled cheese from whole-milk cheese has been solved.

When your Association began its existence, we just began to hear the word "bacteria" spoken in connection with dairy matters. Many problems which confronted dairymen could be solved only through the instrumentality of these minute beings. Through study of these "germs," as we call them, commonly, we have solved the problem of how to retard or prevent the souring of milk and cream, of ripening cream for butter-making so as to secure a uniform flavor; of ripening milk for cheese-making; and of preventing bad flavors in butter and cheese. There are other problems in this line yet to solve.

For example, we want a way to sterilize milk without in any manner changing its chemical or physical characteristics; we need a method of sterilizing condensed milk, which will give us a long-keeping product in all climates; we want to overcome the various diseases to which milk and its products are liable; we want to control flavor of cheese so completely that we can produce any desired flavor at will. We want cures or preventives for all germ diseases to which our cows are subject.

MECHANICS

Many problems have been solved in our generation in the mechanics of dairying. The cream separator has revolutionized our old methods; and it would seem as if we could hope for little more in this line, except a cheapening in cost of these machines to such an extent that no dairyman would be without one.

We might continue indefinitely, recounting the triumphs of deeds accomplished and the hopes of achievements yet to be wrought in the realm of dairy science and practice.

But enough typical illustrations have been drawn from the various fields of dairying to show that we have reason to feel encouraged that so much has been accomplished in so little time; and that we can go forward, confident of achieving even greater triumphs in solving the problems which at present we must class as unsolved.

Mr. Van Norman: There are a number of people here producing milk for the retail trade, and I would like to ask Dr. Van Slyke if milk cooled down very cold, and then warmed up will sour quicker than when it is left at the temperature at which it is to be delivered.

Dr. Van Slyke: It seems to me that is a question that ought not to be difficult to answer, and I can hardly conceive of any good dairy practice which would really justify the idea that cooling milk down and warming it up again, would make it sour more readily. I see no reason whatever to suppose, on any ground, that if fresh milk is taken in good condition, and cooled down, as low as you please, and then warmed up again, why it should sour more quickly than milk not cooled down to anywhere near the same temperature and then treated in just the same way. It is possible that this idea has come about somewhat in this way. I have known of practices of this kind, that the night's milk would not be delivered, but kept at the dairy, and cooled down, and then the morning's milk, warm, would be dumped into this cold milk. Under those conditions the milk would sour much more readily than if the mixing were not to take place. I see no reason, and I do not believe that the cooling down of milk hastens its souring when it is warmed up again. I mean under normal conditions, where the milk is all right.

Mr. Van Norman: At least two of our best dairymen in this State claim that if they cool their milk down to fifty, and then deliver it, it will keep longer than if it is cooled down to, say, thirty-five, and then in the process of delivering it is warmed up again to the same temperature, so that it reaches the customer at the same temperature as in the first case. They do not give any proof of it, but just say it is so.

Dr. Van Slyke: I will simply say that I do not believe it, although perhaps I am open to conviction to the extent of being willing to make an experimental test, and prove it is not so.

Mr. Furnas: I want to say, with the same emphasis as Dr. Van Slyke, that I do not believe it.

Mr. Mack: I would like to ask if putting in the warm cream which is just separated into the cold cream would have anything to do with the flavor of the butter; whether the cream, after it is separated be put in cold water and cooled down, before it is mixed with cold cream.

Dr. Van Slyke: I would like to have some of your practical butter-makers answer that question.

Mr. Raab: I believe milk cooled down near the freezing point, or nearly so, and warmed up, would not keep as long as if it was cooled down sufficiently. It keeps better than that cooled down to the freezing point. Another question which he asks, if warm milk and cool milk are added together; I do not believe it adds to its quality.

Mr. Johnson: I would like to ask another question with reference to mixing the night's and morning's milk, or cream, together. Would you have any objection, or would it cause the milk to sour quicker by mix-

ing the night's milk with the morning's milk, provided they are both the same temperature? All milk, or cream shippers, are under the necessity of mixing the morning's milk and night's milk together, and if both are of the same temperature, do you think the night's and morning's cream being put together, would hasten the decay of the combination.

Dr. Van Slyke: At what temperature?

Mr. Johnson: I presume fifty, or probably between fifty and sixty.

Dr. Van Slyke: Probably not. Of course this all comes back to the question of the action of germs, and anything that raises the temperature up to above sixty, or in the neighborhood of seventy, simply increases their development. They grow faster at those temperatures, and the point is to do everything we can to avoid letting the milk stand at those higher temperatures, which favor the development of these germs that sour the milk.

Mr. Thomas: Take cream at a temperature of fifty, or even colder, down to near the freezing point, when you start from your dairy, and before reaching its destination, it reaches a higher point; what is the result then?

Dr. Van Slyke: Those things are things that can not be avoided, unless you use ice, or some such means when carrying your cream. You refer to carrying cream to a creamery, or delivering cream to the retail trade?

Mr. Thomas: Yes.

Dr. Van Slyke: I advise Pasteurizing the cream. If it is properly handled and Pasteurized when taken out, it will stand a very marked change of temperature, for much longer than cream not so treated. I would advocate the use of preservatives, under one condition; if your customers demand it. I would never advise the use of preservatives unless your customers want it.

Mr. Billingsley: Would you advise the use of preservatives by ignorant people?

Dr. Van Slyke: No.

Mr. Billingsley: Then who could use them?

Dr. Van Slyke: They are somewhat dangerous things to handle, and so long as we have means of preserving milk which are absolutely harmless, why not use those means. We can Pasteurize our milk. That is being done all over, in small as well as large towns. That does not hurt the milk; does not injure its keeping qualities, and does not become expensive. The use of preservatives in milk, or butter, or dairy products of any kind, is really a species of adulteration. It practically comes under the head of injurious conditions. They may not, necessarily, hurt one, but we do not know, and so long as we do not know, we do not want them, but, if your customers demand preservatives you can do one of two things, and that is, put it in, or give them the preservatives, and let them put it in. When you Pasteurize cream, I do not believe it separates as easily.

I am referring to Pasteurized milk now. The complaint is made that cream does not separate from Pasteurized milk readily. So far as I know, Pasteurized cream does not churn as readily as un-Pasteurized. It is also the same in the separator.

Prof. Plumb: I want to ask a question of Dr. Van Slyke, which is from time to time asked me, as I go to the institutes over our State, and I do not suppose there is a question asked on dairy matters that receives a more unsatisfactory reply, than I give to the people on that question. and Dr. Van Slyke touched on that in his address this afternoon, and I want to ask him, and let him answer for the benefit of this audience, as to whether the character of the food fed has anything to do with the quality of the milk? Whether, for example, if we feed wheat straw to dairy cattle, we get poorer milk than if we feed clover hay and oil meal?

Mr. Drischel: I will answer Mr. Plumb's question on a cheese basis. A cow going on the pasture in May and June will produce ten and one-half pounds of casein or cheese, a combination of butter fat and casein together, and I know that at the present time my cows on dry food are producing thirteen and one-half pounds of cheese. You can draw your own inference. So far as the butter is concerned I know nothing. It is on the cheese.

Dr. Van Slyke: That perhaps suggests a statement I would like to make in this connection. In New York State, a large number of the cows whose milk is taken to the cheese factories are fed mainly on timothy hay in the latter part of the spring, and then they are taken out to pasture sometime about the middle of May. Now, we have analyzed the milk of cows from a large number of factories, and we have always noticed that when they went out to pasture that there is not only an enormous increase in the flow of milk, but a marked increase in the amount of cheese-making material, which is explained in this way, that the cows were, as a rule, getting an insufficient quantity of an unbalanced and poor food material, with absolutely no succulence whatever, and they were suddenly transferred to an abundance of succulent, food, ideal, early grass food, and the effect was in taking the cow in a partially starved condition and from poor food, and giving her good food and plenty of it. How much the change in the habits of the cow in transferring her from the barn-lot to the pasture may have had to do with this I can not say, but I am inclined to think that most of the increase in the fat and casein came from the change from poor food, perhaps in insufficient quantities, to a good and succulent food, in abundance. The grass, in the latter part of the season, when it has been dried down, of course has not that effect.

Mr. Drischel: I would like to ask why it is that the loss of butter fat is more sensitive than the quantity of milk, when the cow is under excitement?

Dr. Van Slyke: That is one of the unsolved problems. Nobody knows. I would like to know myself.

Mr. Drischel: That is an important fact. They put the question, why is it there is that loss?

Dr. Van Slyke: I am sure I can not answer it. I hope we will know some day.

Dr. Woollen: I want to express my very great gratification in hearing this paper of the doctor's. It is a marvel to me. As many of you know, this is my first attendance at any meeting of this Association. I am accustomed to attend meetings of another kind, where science is supposed to be somewhat advanced, and it really is advanced in many respects. In those meetings we deal with vital questions, largely; with physiology, and pathology, if you please, and with living tissue, and we are supposed to be the apostles of science; that we are, in our various localities, the ones to present scientific questions for discussion and observation. I am surprised and gratified that science has made the development it has in this department, in which I have dabbled a little, and that we have here in Indiana made so marked an advance in this department of our social life and our social life has attained to such a degree of excellence that you have the good sense to invite such an one as the doctor to come here and bring before our minds these questions, and that these questions are seized upon so quickly by the audience, and the questions that come out are such pertinent ones as have been offered here. I say it is gratifying to me.

But now, to talk on one or two or three of the questions. In the first place I want to call your attention to the development of success. Old mother Eve got into trouble. She wanted to know some things that the almighty God of the universe did not wish her to know. You may talk just as you please about that. There is a limitation to human knowledge. When you begin to deal with a question of that kind, and other questions that come out in the discussion, you are dealing, not with a chemical question, but with a chemical-vital question. It is one thing to make an analysis of food in a chemical laboratory and a very different one in our stomach or that of our cow. When it becomes a chemical-vital process, there is an unknown quantity that comes into operation which I dare say we never can know. For instance take it, as Dr. Van Slyke humorously illustrated, by referring to Dr. Jordan's proposition. Take the egg of a cow, and you put that nucleus into the egg of a hen, and if you could do it you would hatch a calf. But here we are met in this intricate study by the thought that thus far thou shalt go, and no further. When you do that you will have solved this question, but never will you do it. Then, again, when you come to this question of foods, you can put the food into the mouth, you can feed the animal with different foods. That is a chemical question. You can have your balanced ration; You can make your chemical analysis, and you can determine very largely, not wholly so, and possibly that will never be done, because it is not inorganic chemistry but organic chemistry you are dealing with. When you take organized tissue

and begin to make an analysis wherever life has been, where disorganization has taken place, then you will have a very difficult problem. Organic chemistry is very much more complicated than inorganic. Take the food that goes into the cow's mouth. Prepare it in the most scientific manner and put it into the cow's mouth, and you may know something of the general laws of digestion, and you may make analysis of the blood and you find various constituents. We will say the blood is made up of five things, and milk made up of five things. The milk is a secretion. You have the cow and the cow's udder. That cow's udder does not act as a doctor does in his chemical laboratory. Shoot the cow and the life in the udder stops at once. There is life there. You can't have a secretion except in the living tissue. The glandular tissue is endowed by the God of Nature with the power that we call secretion. Milk is made up of these different elements, and that is a chemical-vital process. We have got to deal with that process. You can not get something out of nothing. That is contradictory to the teaching of science. You must have something out of which to make something. You have got this chemical-vital process. When a man begins to talk about regulating that he is attempting to do a great deal, more than when he halts the lightning, where he has only one element to contend with. Here he has five or ten. He has that complex thing the udder of a cow. It seems to me that what we want to get hold of is the fact that we can not get something out of nothing. There are hundreds and thousands of cows in this country that are not in their normal condition. They are diseased and starved cows. You may not be in your normal condition and you go to your physician and you ask him, What is the matter, doctor? The long winter has been telling on you very much. You are in what we term a pathological and diseased condition. You are below par, and you take hold of that man or woman and in a month afterwards he is up and coming, in good style. The cow is doing the same thing. When you increase the flow of milk, and the amount of butter and casein and protein, it is simply because you are making the cow natural again, but when you get her up to her natural limit she is there, and there is no power in the universe, except in God himself, that can increase that, according to my notion. This increase of food is simply making the cow more healthy and vigorous, and more capable of reaching that standard which nature has ordained for that given cow.

THE IMPORTANCE OF A THERMOMETER IN THE DAIRY.

BY ROY MACK, DANA, VERMILLION COUNTY.

It is the purpose of this paper to discuss the need of a thermometer in the dairy, for few dairymen and a still less number of the country butter-makers make use of this instrument, and this partly accounts for

so much poor butter that is found on the market. Also, perhaps, why people say there is no money in butter-making.

A thermometer is an instrument for measuring temperature. It usually consists of a glass tube or capillary bore terminating in a bulb and containing mercury or alcohol, which, expanding or contracting according to the temperature to which it is exposed, indicates the degree of heat or cold by the position of the top of the liquid column on the graduated scale.

Mercury and alcohol are used because they require a much lower temperature to solidify and a much higher temperature to vaporize them than any other liquids that would be convenient to use.

There are quite a number of different forms of thermometers, of which there are several types used in dairies. Three of these different forms are more or less common. One is a straight glass tube, eight inches in length, another is a glass tube with a bulb in the center; the bulb keeps the instrument from falling too low into the milk or cream. These two kinds are known as "floating dairy thermometers." They always stand erect in the liquid, because there is shot or lead above the mercury bulb. The third form has a tin plate which protects the bulb and glass tube, and may be better than the others on this account, but is more difficult to keep clean.

A thermometer should be kept clean so the figures will be plain and that there may be no trouble in accurate reading; this may be done by washing in warm water immediately after using.

Thermometers differ in their accuracy. The very cheap ones are usually more or less inaccurate. The bulb thermometer is correct, when corrected by a "standard thermometer," and is more accurate than the others.

A number of stores where dairy thermometers are sold were visited to examine into their accuracy. Eight thermometers were examined, which sold at twenty-five cents each and showed the following temperature: 62, 63, 64, 65, 63, 62, 82, 64, and at another place, where the price was forty cents, the readings were: 54, 57, 58, 60, 62, and all in each lot should have read the same.

The higher-priced thermometers, which are the most reliable, and the only ones that should be used in the dairy, can be gotten only from dairy supply houses.

In order that cream may be properly ripened before churning, it is necessary to set it at a temperature which can be gotten only by the use of a thermometer, which will produce the proper degree of ripeness. The temperature at which cream should be set to ripen will vary as the time of year. A higher temperature is necessary in winter than in summer, and the degree of ripeness will have much to do with the success of the churning.

The temperature at which cream is churned will have much to do with the length of time required to churn, the yield of butter, the condi-

tion of the butter, and the amount of fat left in the buttermilk. As regards time the higher the temperature the quicker the butter will come and also the more fat left in the buttermilk.

In a number of churnings made at the Purdue dairy it is shown how temperature affects the time of churning and per cent. of fat in the buttermilk.

Temperature, in Degrees.	Amount of Cream.	Time.	Amount of Butter Unworked.	Fat.
53	21 pounds 7 ounces.	35 min.	6 pounds 7 ounces.	10%
58	21 pounds 7 $\frac{3}{4}$ ounces.	9 min.	7 pounds 3 $\frac{3}{4}$ ounces.	3 $\frac{1}{2}$ %
62	17 pounds 9 $\frac{1}{2}$ ounces.	26 min.	5 pounds 1 ounce.	20%
58	24 pounds.	10 min.	8 pounds $\frac{1}{2}$ ounce.	150%
53 $\frac{1}{2}$	35 pounds 5 $\frac{1}{2}$ ounces.	22 min.	9 pounds 3 $\frac{3}{4}$ ounces.	16%
59	18 pounds.	9 min.	6 pounds 7 $\frac{1}{2}$ ounces.	40%

Sometimes other things besides temperature determine the length of time required, and also determine the temperature at which you must churn.

In the churning of sweet and sour cream, a lower temperature is necessary for sweet cream, to secure the proper separation, than for sour cream. Trials were made at the New York Experiment Station with sweet and sour cream. Sweet cream churned at 68 degrees was churned in eight minutes, and left 4.07 per cent. of fat in the buttermilk and again was churned at 54 $\frac{1}{2}$ degrees, time was twenty minutes, and the fat left in the buttermilk was 0.2 per cent. So churning sweet cream at a high temperature will give a great loss of fat, but if churned at a temperature from 50 to 54 degrees the loss will be no greater than with sour cream.

The temperature for churning in order to secure the best results is influenced by many changes and it is impossible to decide upon any fixed temperature to be used under all conditions, but a lower temperature is necessary in summer than in winter.

But other conditions being equal, a churning made at 60 degrees and above, will leave buttermilk richer in fat, and the butter will be softer than a churning made at 55 degrees and below.

A thermometer should be kept in the churning room, so the room may be kept at a uniform temperature.

In order for the dairyman to secure the best results in butter-making he should make use of the Dairy Thermometer.

Prof. Plumb: Mr. Mack is an agricultural student of Purdue, and has charge of the college dairy, and has engaged in every-day work in the dairy, and it struck me there was quite an object lesson in his experience in going through the stores in Lafayette where they keep thermometers, and making a record of them. It shows that the dairyman when he buys a thermometer should buy a good one.

SOME OF MY CHEESE-MAKING METHODS.

W. L. M'CAIN, HORTONVILLE, HAMILTON COUNTY.

The first thing which I observe in the manufacture of cheese is cleanliness, not only in the factory, but as well among the different cows and their keepers.

All the animal heat should pass from the morning's milk before it is mixed with the evening milk and then it is transported without being jarred or jostled very much.

In the factory I receive no milk that is in cans which are not daily cleansed and steamed. It must be sweet and pure.

Add enough coloring to give a rich color and then heat the milk slowly to 85 degrees and add diluted rennet. I dilute it to prevent curdling, before the rennet is thoroughly mixed. It takes about five minutes to mix. I require from 25 to 35 minutes for a good curd. If ever I have a floating curd I draw off the greater part of the whey and add some moderately warm water. This is to weaken the lactic acid and reduce the acid to the proper amount. Then heat as before, not heating above 95 degrees in cooking.

In cooking, the maker has the curd under his control. If he has not added too much rennet.

Rennet does not aid in ripening cheese, and I use as little as I can. It simply changes the milk to a gelatinous mass.

When the whey is drawn off the curd should be soft and retain moisture, thus being under complete control of the maker. And it must then cool slowly to 85 degrees, then add salt, but not too heavy. It should be in proportion to the amount of rennet. Then the curd is in its normal state to commence curing.

It should be entirely free from all taints and odors. Should remain in the press from four to six hours, then be removed and dressed and placed in press again until next morning.

The curing room should always be darkened and the same moderate temperature kept, with good ventilation, not allowing gases and foreign substances to enter the room. The cheese should be greased well and turned at six o'clock in the morning and again at six o'clock in the evening of each day. Ten to twelve days are required for my cheese to cure.

MILK TEST.

A room especially for that purpose, with milk acid and a temperature the same.

I take a certain amount of acid of a known strength to a certain amount of milk at the same temperature.

No man can test correctly without knowing first how to test the strength of his acid used in testing. In no two rooms will the test be the same, as in making cheese. A person must be his own guide and be commander of the situation. In no two days are the results, of making cheese, the same. Or in no two factories are the results the same. Man under different circumstances and conditions must be master of the situation.

Mr. Drischel: What process have you for maturing cheese in two weeks?

Mr. McCain: I sell all my cheeses not over fifteen days old, and they are in good condition. I have them in a dark room, no light at all, but I air it out at night in the summer time. My cheese is ready for the market in ten or twelve days.

Mr. Drischel: What temperature do you keep your room?

Mr. McCain: About seventy, even temperature.

Mr. Drischel: I am in the same condition as Mr. McCain with reference to the trade. Our trade demands a certain kind of cheese, and we can make just as good cheese in the State of Indiana as in any State of the Union. The trade demands cheese from two to three weeks old, and our cheese goes onto the market not matured. It should be shipped at least two months old in the winter months and from four to five weeks during the summer months. That is the reason I put the question to him how he matures the cheese in that time, but I see he is situated the same as I am.

Mr. McCain: They want good cheese, not cheese that lie around a man's house from six to eight months. The people want something good to eat. (Laughter.)

President Woods: We make as good cheese in Indiana as in New York.

Dr. Van Slyke: So far as I understand the conditions I see no reasons why you can not. The water you have and your grass is good. The cheese that people want is a cheese that is mild in flavor and that they can chew on awhile. They do not want it to go to pieces too soon in their mouths, and a partially cured cheese is what suits them. It is not sharp, but just mild in its flavor, and they can chew on it quite a little while, and that is what a very large number of our cheese eaters want. They do not care how it behaves after it gets into their stomachs, and the only thing to do is to give them the kind of cheese they want. As was said by the gentleman, a properly cured cheese that is really fit to go into the human stomach, ought to be, in winter, two months old, and in the summer thirty or forty days old. In my own case I should prefer to have the conditions of the temperature held at a rather low temperature, that is, never above sixty-five, and keep the cheese six months; that is the way I would have it.

President Woods: That puts me in mind of a story of some sailors who on a voyage ran out of meat, and the sailors got into the captain's

meat, and they said the meat was all right, but that there was not enough chaw to it.

Mr. McCain: I would like to ask if the test is made for butter in the butter room, or a room especially for the business?

Mr. Furnas: It is very important not to let the oil in the test tube get cold, but in using the steam Babcock machine it would make absolutely no difference what the temperature of the room was because the steam would do the work. I do not think the mixing of materials in the milk would be important, but it is important that the oil should not get cold.

Mr. Drischel: Do you buy your milk for cheese by the Babcock test?

Mr. McCain: Yes.

Prof. Plumb: If you do not have a steam machine, you should have your milk and acid in the neighborhood of seventy degrees, or a little more, and then use very hot water to put in the bottle. Then if you will set your bottles in a shallow pan with about an inch and a half of hot water in it, then your bottles may be kept in good condition. This will help to keep the butter fat in a clean condition. But if you take them out of the machine and put them in a cold draught where they will be chilled down rapidly, you will get an unsatisfactory reading, because the fat contracts in the neck of the bottle and you get an inaccurate reading, while if it is kept hot while you are reading it, and you do it reasonably soon, you will get an accurate reading.

Mr. McCain: I want to know what strength of acid you use in the test?

Prof. Plumb: I have had a little interesting experience in Indianapolis on that question. We require an acid that is called 1.82 to 1.83 specific gravity. One would naturally think that in a city like Indianapolis there would be no trouble on that score, but a year ago last fall I went to the State Fair with some students working a dairy there, and I didn't take any acid down with me from Lafayette for the reason that I thought I would have no trouble in getting suitable acid in Indianapolis. The druggists there did not know what the specific gravity of their acid was, and I went to about eight drug-stores in Indianapolis, a part of them being wholesale houses, and the others were retail houses, and I had a good deal of trouble in getting the right acid. They told me in some of the drug-houses that they bought their acid of local establishments here in this State that made it, and they did not know what the specific gravity of the acid was. So I got a little of it and it was altogether too strong; it simply turned the butter fat black right off and gave no satisfactory test whatever, but it happened that I had an acquaintance at the State Fair who had had something to do with that same kind of work, and he put me on the track of a drug-store in Indianapolis where I found it. This simply illustrates that a man in trying to make the Babcock test may get an acid that is not right and his test will not be right. There is no use of buying any acid until you know what its specific gravity is.

Mr. Drischel: I want to call the attention of this Association to the broad fact that the Babcock test is used by the creameries of this State, but I venture to say that nine-tenths of the farmers around Mooresville do not know the nature of the Babcock test, and it is important that in the future meetings of this Association the test should be brought to the attention of the public and a competent man illustrate the test, and the chemical action of the milk, sulphuric acid, and hot water.

President Woods: Wouldn't it be a good plan to have the people bring in the milk for testing?

Prof. Plumb: I do not believe it would. Some of the younger members of this Dairy Association may not be aware of the fact that we had it at Crown Point. We had a Babcock machine there, and a large meeting, and of course we tried to get as good a program as possible. It would be an interesting thing perhaps to bring in some of your milk and test it in the Babcock machine, but I have taken the Babcock machine with me and given examples of its work at Farmers' Institutes, and the people brought me what they called milk but which filled the neck of the Babcock bottle with fat so thick that it could not be read. There are people in this world who will tell you that what they bring in is milk, and pure milk, but nevertheless there are people in this world who will dip a little cream in it, to make it a little richer, and the result is more harm is done than you realize in making a ridiculous test.

Mr. Drischel: Mr. Plumb knows nothing about what is brought to our attention by our patrons. They will contend that their milk is better than their neighbors. I think it is important to introduce it in some way to be a guide for the public. I think Mr. Plumb could bring one or two students from Purdue here and have the machine and chemical processes illustrated, and I do not think it would take up much time.

Mr. Johnson, of Mooresville: I wish to correct one impression given out by the speaker on the floor. Instead of not one in ten knowing anything about the Babcock test, I think there are not more than one in ten in this vicinity who does not have a Babcock test. We keep the Babcock test at the barn, and in our cream-houses, and we test our individual cows to know whether we are feeding them properly or feeding them for fun or for milk, and I think it is a very important question for every dairyman to have a Babcock test and know how to operate it. Over here we had a little trouble getting acid, but usually we get the commercial acid all right. Most druggists keep the chemically pure acid, but that is too strong. We are able to get the commercial acid and it answers very well for the purpose, in this community.

President Woods: Did you ever find out whether it is a cow that regulates the butter fat, or the feed?

Mr. Johnson: My experience is that it takes a good feed and a good cow. You can not take a poor cow and make lots of butter. It takes a butter cow to make butter; she has to be born such.

President Woods: Can you increase the quality of food and make more butter fat in her milk?

Mr. Johnson: Not when the cow is in a normal condition. They vary in condition with reference to the period of lactation. I am thoroughly convinced that the feed has not so much to do with it as the breed of the animal. Get the animal first and then feed her correctly afterwards.

President Woods: I tested my cows with the Babcock test. I had thirty cows in a row in one stable. These cows were treated alike and handled the same, and one tested two and two-tenths, and another seven and four-tenths. If that was not a difference in the cows, how can you explain it?

Mr. Johnson: We take a sample immediately after the cow is milked, after milking her perfectly dry, see that it is thoroughly mixed. In order to obviate any trouble afterwards, we take the sample right out of the milk so there is no possible chance of getting poor milk.

Dr. Van Slyke: As a rule the fresher you take the sample of milk the better; the sooner after milking. I would take my samples of milk and get them in the bottle as soon after milking as possible, although, with proper care, there is no reason why the next morning you should not be able to mix back the cream into the milk sufficiently to make a good test.

Mr. McCain: Does the cow give richer milk in the night or in the morning?

Dr. Van Slyke: It depends. As a rule, the further the milkings are apart the larger, of course, will be the yield of milk, and as a rule, the smaller the per cent. of fat. The nearer the milkings are together, and the smaller the quantities of milk, the larger the amount of fat. That does not always hold good, but it does in the great majority of cases. If we were to milk regularly, say twelve hours apart, we would get milk about the same quality, provided, of course, they are under the same sort of conditions.

Mr. Raab: I differ. I can see the cream two hours after I quit my milking, and when it condenses and gets thicker it measures less inches, it is less per cent. of cream, and I find in the summer time more than in the winter when I milk mornings and evenings the same way, but the morning's milk in the summer time is richer, and more cream on it when I skim it than the evening's milk, and I find the separation in the separator the same way.

Mr. McCain: I want to ask if the Jersey will make more cheese than the Holstein?

Dr. Van Slyke: I will answer that question to-morrow morning.

President Woods: I appoint as the Auditing Committee, G. W. Drischel and D. B. Johnson.

Prof. Plumb: I move that a Legislative Committee be appointed, consisting of five persons, said committee to be appointed by the President.

Motion seconded and carried. It is also decided, on motion that a committee of five to be known as a Committee on Resolutions be appointed by the President of this Association.

Thereupon the Convention adjourned at 4 o'clock Wednesday, December 14, 1898, until 7 o'clock in the evening of the same day.

Mooresville, Indiana.

Wednesday, Dec. 14, 1898, 7 p. m.

The Convention reconvenes, and at this meeting the music was furnished by the Monrovia orchestra.

PRESIDENT'S ADDRESS.

BY SAMUEL WOODS.

Ladies and Gentlemen—This meeting is in the interest of intelligent labor; to make labor more profitable and life more worth the living on the farms of Indiana.

When I was a boy, the cattle were enclosed in large yards, with sheds made of logs, and the roofs covered with wild-hay, hay-stacks built around this yard, and in the winter the stacks were cut down with a hay-knife, the hay thrown over the fence and fed in large racks built of logs. All the cattle ran together. When the cows were to be milked we would take two pails, one with a few ears of corn in, and one for the milk, get the cow up in some corner and give her the corn and then milk her. Her teats were cold and sometimes frozen, and she did not like to be milked, and she was not milked very much, for there was not much milk to be gotten.

What has brought about the improved condition of the dairy business, as well as all farm operations? Is it the expenditure of muscle or brain? Brains have found out that a cow wants comfortable quarters. Brains have found out that there is a difference in cows. Brains have found that some feed is better for a cow than others. Brains have found out how to produce a good cow, and brains have found out how to produce a good dairyman and dairywoman. These Dairy Associations, Agricultural Schools and Dairy Literature have been great factors in helping to produce the brains. We can stay at home and read, and keep well up with the times, but that don't seem to be the whole thing. There is a social nature to people if they do live on a farm, and it does one good to attend these Dairy Associations and come in contact with one another, shake one another by the hand and have a good time; as the poet says, "A fellow feeling makes us wondrous kind."

About one of the best illustrations of this getting together and polishing one up—I saw up in Michigan, in the woods, where they were mak-

ing clothes-pins. The trees were sawed up into lumber, the lumber resawed into strips and short lengths, and then turned into the shape of a clothes-pin, and then sawed up to make the crotch, and there was your clothes-pin, but it was in the rough. They then took a whole lot of them and put them in a great big cylinder or drum which was revolved by a belt, and they were turned around and around in that drum until they were smooth, better looking, and were actually better for being in there and rubbing up against one another. And that is the case with a dairyman or any other man. It is the social qualities in us which makes us of use to the public. I care not how successful a person is financially or morally, if he is not a success socially, he is not a complete success. I want here to thank Prof. Latta and the Purdue faculty for the wonderful good they have accomplished with the means at their command, through our County Farmers' Institutes.

It seems to me that Purdue, the Farmers' Institutes, and the Indiana State Dairy Association are factors for good in the State which we are hardly capable of realizing. The Indiana State Dairy Association and the Institutes are in fact an extension of our Purdue. It goes out on its mission into the byways and highways, and invites our people interested to come together and learn of each other the better methods. Its mission is to carry knowledge to the people for their benefit. Its field is the State, and as the knowledge gained will add to our individual benefit, it will at the same time increase the productive wealth of the State. Formerly the Association meetings were held in Indianapolis, with varied success. Something was out of tune. The city folks did not take a kindly interest in cows, and it was then very wisely found that its mission was not in city life, but with the men and women on the farms, and so they determined to go out to the small towns of the State, right among the cows, the milk-shippers, the private dairies and the creameries, and here they found a congenial field, a welcome, and a people who appreciated the purpose and the opportunities of meeting with men and women who by careful study and practical work in the dairy line could tell them where they failed; could show them, not a fine theory, but a better way and a way learned by experience, to success; could show them the possibilities of a dairy cow, and how, by kind treatment, by warmth and comfort, and by proper rations, their cows would be to them a source of pleasure and profit.

We also have a duty to perform beyond our families, ourselves and our cows. Our government here is of the people and by the people, and we as taxpayers, farmers and dairymen, want to attend to that part of be the men who pay for running this government. We ought to go down down to our legislature every time it meets, to tell the law-makers what to do. It looks to me if anybody is going to tell them what to do, it should be the men who pay for running this government. We ought to go down there this winter and tell them we want a pure food law. If a man pays

for ginger, they must not give him sawdust, and if a man pays for butter, they must not give him tallow and cottonseed oil. And we want a ditching law, so it won't cost more for the lawyers than it does to dig the ditch. And we want a law to compel every landowner to cut up and destroy all noxious weeds, so we can rid our farms of weeds, and grow corn and clover instead. And while we are down there, we want to tell them it costs money to keep those Farmers' Institutes going. And we want a good healthy amount for the Indiana State Dairy Association.

Agricultural Education, illustrated with magic lantern, by Prof. W. C. Latta, Purdue University; and Neighborly Folks, Prof. Emma Mont. McRae, of Purdue University, were thoroughly enjoyed by the large audience.

The evening session was attended by many who would have little interest in purely dairy subjects, and these two papers were presented with a view to interesting such an audience. They are omitted because of shortage of funds for printing expenses.

The Chair appoints as a Committee on Resolutions, Samuel Schlosser, L. W. Thomas, J. H. Harvey, William Sykes and H. E. Van Norman.

The Chair appoints as a Committee on Legislation J. J. W. Billingsley of Indianapolis, F. P. Johnson of Howlands, Marion County, Dr. Woolen of Indianapolis, W. C. Commons, of Centerville, and G. W. Drischel of Cambridge City, Wayne County.

Thereupon the Convention adjourns at 10 o'clock p. m., Wednesday, December 14, 1898, until to-morrow morning at 9 o'clock.

Mooresville, Indiana,

Thursday, Dec. 15, 1898, 9 a. m.

THE ECONOMY OF CALF RAISING.

D. B. JOHNSON, MOORESVILLE.

Mr. Johnson: I will make a few introductory remarks with reference to the breeding of this calf that we are going to talk about raising this morning. I think the economy of calf raising takes in not only the raising or rearing of the calf after it is born, but it is best to have only a good calf born, and it is necessary to begin back a little in order to get something which it is worth our trouble to raise. Our object is to produce a cow, one of those large benevolent cows that is constantly giving off her produce. We can see that large, well developed Jersey cow, with her wedge-shape, and large intelligent head and brain, that has just the shape to produce, after she is fed what she should be fed, the butter, the milk,

and the cream we desire to manufacture, and it is absolutely necessary that we have the right kind of breeding. I believe, as Dr. Van Slyke said yesterday, that the dairy cow is born. You can not make a large producing cow for the pail, out of just anything, and any kind of breed, but I believe you have to go back far enough and have the right kind of material to build on, so that in our calf raising we have endeavored to lay the proper foundation, and have tried to breed and produce a calf that is worth raising. There is just one other thought on the point of benevolence. Mark that one point. Note the beef animal; she takes on fat. We do not want to produce that kind of a cow, but want a cow like I have mentioned. In the first place, after the calf is born the first few days, or the first week or two, we regard as the most critical period in calf raising. If we can get the calf past the first two or three weeks we are pretty sure of being able to raise it. A few years ago we had no trouble in raising a calf, but the last few years we have been troubled with calf diseases which have been a little serious in our case, but we have been able to get over a good deal of that, and we are not losing a great many calves. We have been trying a good many remedies and we have at last found one that has helped us a good deal. We usually let the calf suck the cow about four days, and then take the calf away and raise it by hand. In exceptional cases we let the calf suck ten days, but as a rule, the sooner it is taken away the better, and we have had to keep an extra cow or two in the barn that we call our skim milk cow, in order to raise these calves on, from the fact that the milk from the average Jersey is too rich to feed a calf with when it is very young, to give it as much as it ought to have. We commence feeding the calf on the milk from the other cow that does not test over three or three and one-half per cent. We give it whole milk for a week or two, and gradually wean it off and feed it on skim milk, as far as milk is concerned. In two or three weeks we commence feeding bran and a little hay and silage, and we have the calf begin to eat very early, when it is some two or three weeks old, feeding it clover hay, and we encourage that feature as much as possible, but the thought all the way along in our feeding is to produce a calf that will not take on fat, but make a protein calf, consisting largely of lean meat, and not putting on fat. There has been many a calf spoiled by giving it too much rich food and encouraging it to put on fat. Whenever we find a calf is getting very fat we are fearful of not getting a good cow. We feed more protein foods, such as skim milk, wheat bran, clover hay and that line of foods with possibly a small grain ration. We continue on that line of feeding until the calf is five or six months old when it is taken off of the milk and put entirely on other feed. We were compelled to raise our cows from the fact that we were unable to buy the ones we wanted. We tried for several years to buy a dairy and found that to be a complete failure, so we undertook to produce a dairy by raising our own cows, and we have been amply repaid for our trouble, and are well satisfied with the prospects in view

of producing the herd we want by raising our calves. We have had for the last three years more or less trouble losing calves before they are a week old by some calf diseases. One of our neighbors gave us a remedy once which we have been using a year with perfect success, and that is, about a tablespoonful of common salt. That would have been the last thing that I would have thought of giving to a calf, but we have tried it, and we have been able to save the most of our calves now. When they take the scours we give them a tablespoonful of salt, and we generally find that one or two doses of that is sufficient. There are probably other remedies that are just as good. Castor oil is pretty good. We tried castor oil and laudanum and it proved successful. The druggist gave us croton oil and that cured that calf in about thirty minutes.

Mr. Raab: One teaspoonful is enough of castor oil to give.

Mr. Johnson: I think an important feature at the present time is to know how to prevent diseases in calves. I have opened the discussion and that is all I care to do as I presume there are lots of men here that have had a larger experience than I have. I would like to know whether or not it is advisable to feed young calves a strong grain ration, and make your calves look fat and sleek while young? Is it advisable to do it, or would you have those calves grow healthy and strong without a disposition to put on fat?

President Woods: Do you think that skim milk, wheat bran and clover hay is a complete ration to raise a calf on?

Mr. Johnson: That is about as near as I could give. That is my idea of a ration, with possibly a small grain ration which we get in our corn silage. We feed corn silage with a great deal of corn in it. We plant the corn so it will develop as many bushels to the acre as if we desired to take the ear off, and that makes a rich silage, and we feed that ration as a grain ration to our calves.

President Woods: If I remember right they recommended heretofore flaxseed, but now they recommend corn meal.

Mr. Johnson: I would like to hear from Dr. Van Slyke on this question.

Dr. Van Slyke: I would not venture to give any advice about raising calves.

President Woods: It seems to me that skim milk, wheat bran and clover hay have too much protein.

Major Alvord: That depends on this indefinite ration coming from the silage. In my experience I have not been very successful using silage for young calves. While the major part of their food is milk I find the silage is better to keep away from them than to give to them. Give them dry hay. Of course if the hay is clover you have to get your carbohydrates somewhere. I have been able to get calves to eat fine corn meal better than any other grain food, and it is much safer than oats or bran. I am

careful not to feed too much corn meal. I then begin to teach them to eat other grain with the corn meal.

Mr. Johnson: In starting out a calf about what amount of corn meal would you give?

Major Alvord: Nothing but corn meal to start with, possibly a spoonful, or such a matter, and never more than a handful. I believe in keeping calves in a fairly good condition. I think it is a mistake to go to the other extreme, but not let them get beefy. There is one point in particular I would like to mention in connection with this subject of losing calves when young. I have adopted a method in my own practice, and have maintained it for twenty years, I suppose, or thereabouts; I do not find many people who will agree with me about it, yet my success has been good and I will mention it. The difficulty which many people have had of losing good cows for milk fever is caused by the condition of the cow during the last month before calving. I think the cow should be in the very best condition possible physically, at the time of calving, and while it is necessary to shorten the amount of food to some extent to keep her from accumulating flesh, yet two or three weeks before calving I begin to feed my cows nourishing food, not fattening food but nourishing food, and thus my cows for the last two or three weeks before dropping their calves are themselves gaining in strength, and are on the upgrade instead of the downgrade, and it has been a rare thing for me to lose a calf which has been born alive, in a reasonable sized dairy herd.

Mr. Raab: You do not feed corn meal?

Major Alvord: No, sir; but I feed the cows liberally of the right kind of food, not heating food of course, especially linseed meal which is a good food on the bowels, but bran and oats and such things as that. I have fed gluten meal. Calves are put too soon on grass many times. I would give more for two cows which drop their calves in the fall than for three in the spring, and I do not let them go on the grass the first season. They go through their second winter before they go to pasture, and I find that although it takes a little more care and watchfulness that is the very thing that helps it, for you see the calf every day, but if you carry it through the winter until it is five or six months old, and let it go out on pasture, you will hardly see it for five months, and there will be a great many opportunities for accidents to occur during that time, but if I keep it up during the first summer somebody sees it every day, its diet is controlled, and it is during this period that the digestive organs should be encouraged and developed, and I am rather inclined to have a yearling a little pot-bellied than otherwise, having a good big well developed set of digestive organs, and I think this is better obtained by feeding them on an abundance of dry bulky food until they get through their second winter.

Mr. Knox: There is one point that I think has been overlooked, and that is giving the calf plenty of water. I think it is as necessary to give a young calf plenty of water as it is the older calf.

Mr. Shugart: That is a question I would like to hear discussed, with regard to calves being kept off the grass until they are four, five or six months old. In what little experience I have had I see it makes a marked difference in the calves. I tried it last season with some calves kept in the stable until they were six months old and others turned out after they were six weeks or two months old and I see a marked difference in them.

President Woods: Which were the best?

Mr. Shugart: The ones kept in the stable.

Mr. Welborn: I have had a little experience raising calves. The greatest difficulty we have had to contend with has been the scours. I have used salt with very good results. I have also used beef rennet. Calves that are raised by hand I feed milk, and put two or three drops of beef rennet in it. I think for grain ration we have as good results from shelled corn as anything we ever fed. Oats are excellent to feed young calves. From one to two ears of shelled corn is a good feed for calves. It don't increase the fat but makes the calf strong and healthy, and gives it plenty of warmth, and it regulates the bowels to a certain extent, whereas, if you feed corn meal it has a tendency to disorder the stomach.

Mr. Johnson: I think we often let our calves have too much milk, and we are very particular to let our calves have only a small ration at first and increase it as they are able to manage it and digest it.

Mr. Billingsley: I do not care to controvert any of these points particularly, but for a calf six months old if there is a better balanced ration than good blue-grass pasture, and plenty of good water, I don't know it. I do not like the idea of keeping a calf up for eighteen months before I turn it out to good blue-grass pasture. When I do that I think I am sinning against light and knowledge. We raise our calves mostly by hand. We only raise those that are bred from our best cows. The others are discarded one way or another sometimes, anything to get rid of them. We use oil meal to some extent, some corn meal and some bran, but it requires a great deal of care. Calf feeding is one thing we can not afford to neglect. It must be fed, and watered regularly and cared for regularly. I believe that the thought that we ought not to make our calves too fat, is a good one. I have one in my dairy to-day that has been fed too much, because it is a pet calf, and my family takes extra care of it, and she is not a good milker on that account. She lays too much of her food on her back in the way of fat. I do not like that idea in this country. It may do in New York all right, and other places, but here where we have such blue-grass as we have, do not, I pray you, keep them up eighteen months for fear of letting them go to grass.

Mr. Shugart: What is your theory as to whether you should let them out on grass before they are six months old, or keep them in until they are six months old?

Mr. Billingsley: In my experience I teach the calves to eat. In regard to shelled corn it has been my experience that there is hardly any

better food for calves than shelled corn; not too much of it, but some of it. There is a peculiarity about it. I am not able to tell why it is the case, but calves up to the time they are a year old, in my experience, pass no whole grains. They digest it. I don't know how it is in your observation, but that is mine. If I had blue grass I would let them go to grass as soon as they could eat it well and still keep up the feeding. As soon as they are three or four months old I let them go on clover even, and let them stay there during the summer, and we feed them at the same time, and the calves do well.

Mr. Hanning, of Evansville: Has anyone here had any experience in dehorning calves with caustic potash when they are between two and five weeks old? I dehorned one Saturday evening.

Mr. Johnson, of Mooresville: The men here have a practice of taking a knife and cutting the embryonic horn out. It seems to me from what I hear that it is more humane, and hurts less, and heals up quicker and is much better.

President Woods: I believe it would, for the caustic will burn in there, and it will form a hard scab, and it is a long time before it goes away, and every time it is touched it hurts them, and it seems to me that there is more real pain in taking horns off that way than by sawing them off. We have had a great many calves that in twenty-four or forty-eight hours lie down and die. We gave them a dose of good strong hot cholera medicine as soon as these symptoms came and it didn't do any good. We concluded then to give them something as soon as they were born, and we did, and after that, I don't know whether they just took a notion to stop, but we didn't lose any more calves.

Mr. Mills: I have dehorned one calf with perfect satisfaction, three months old, using caustic. I did that by using the caustic pretty thoroughly around the skin. Whether it is put on the point of the horn or not makes little difference. It will do the work and do it right. It takes it out by the roots. As far as feeding the calf is concerned, I have tried oil meal and corn meal and they have had a tendency to scour. Whole corn has the opposite effect, and clover hay and whole corn with a little skim milk will make a very good food for calves, and the salt remedy for scours is as good as any. I just take a handful and put it in its mouth and try to get a little milk down afterwards.

President Woods: How often?

Mr. Mills: About twice in one day is sufficient generally.

Mr. Johnson: I would like to ask Mr. Billingsley what it costs to raise a calf up to the time of dropping its first calf?

Mr. Billingsley: An estimate was made by our Dairy Association, taking the testimony of several dairymen, and the cost was put at twenty-five dollars; after that it is considered they will pay their own expenses.

MARKETS FOR DAIRY PRODUCTS.

BY MAJOR HENRY E. ALVORD,Chief of Dairy Division, U. S. Department of Agriculture.

Many careful observers have long believed that the weakest feature of American agriculture is the business side of it. The ability to buy well and sell well very largely determines the success or profit in conducting any calling which involves the element of trade. This applies especially to farming; and although it may be more true of other branches of the industry than of dairying, the business aspects of dairy farming certainly deserve far more consideration than is generally received. And this is largely true of the co-operative forms of dairying, as well as of the individual operating the farm dairy.

Whether acting singly or collectively, farmers can use prudence, shrewdness, judgment, to very great advantage in making necessary purchases and in managing the cost of production. It is my opinion that the best opportunity for direct and immediate profit in farming under present conditions in this country lies in the study and practice of such methods of true economy as will reduce the cost of the various crops of the farm and of the commodities which the farm has to sell. This is an important business side of farming, and one which will bear much attention. I should be pleased to discuss the opportunities for reducing the cost of farm production in general, and particularly of dairy products—milk, butter and cheese—but that is not my purpose on this occasion. I wish to consider now the other side of the business, the matter of disposing of the products of dairying.

All who have given the matter any serious attention will agree with me that, other things being equal, in any dairying community the farmer or farmers who are best at selling their products, who know how to find the best markets and to hold them, are the most prosperous and successful. And among different creameries or cheese factories, those which are fortunate in securing men of experience or good judgment as their managers or selling agents are the ones which pay the most to their patrons. Good business management of the farm or factory counts much in the profit of dairying. And one of the most important points to study is that of "The Best Markets for the Dairy Products" which are to be sold.

In considering the question of the most desirable markets for any dairy farm or factory, it is necessary to fully understand and make due allowance for the modifying conditions which are almost certain to apply to every particular case. The probable need of such modifications must therefore be clearly borne in mind while discussing phases of the subject which seem to be of general application. And what is true in relation to

farm dairies may sometimes not apply to creameries and factories, and vice versa; but in most instances the principles of markets and marketing are applicable alike to the seller or shipper of dairy produce in quantities small or great.

The first statement which it seems entirely safe to make is that the home market, or near-by market, is pretty sure to be the best of all. This is certainly true until the natural demands of the neighborhood market are fully supplied; and further, until that demand has been stimulated and cultivated to the utmost, as to both quantity of consumption and quality of supply. A few illustrations will be in order:

The farmer who can find good, reliable, continuous customers within a reasonable distance to whom he can supply the products of his own dairy at prices well above the average wholesale rates of his locality will usually waste his time in trying to find a better market. Yet such may often add considerably to his income, without material increase in cost of product, by improving the quality, or giving extra finish or fancy forms to his milk, cream or butter, and securing a better class of trade and higher prices. Many private dairymen have satisfactory markets of this kind, with such prices earned by the quality of their products and the efficiency of their service that their receipts per cow are far above what they would obtain if they sold their milk to factory or shipper, or contributed it to a co-operative creamery. The actual profit in such cases will largely depend, however, upon the kind and true cost of the labor used on the farm, in handling the milk, making the butter, and in delivering the produce to customers. On the other hand, it is doubtless true that a majority of the farmers producing milk are so situated that they can get the largest net return by selling their milk or patronizing a creamery. In their cases the opportunity for improvement lies in raising the quality of their milk, getting better prices, and in lessening the cost of production.

While unable to give exact comparative figures at present, I am entirely correct in stating that the creameries in the New England States, largely co-operative, pay their patrons much higher rates for milk or butter-fat than those in other parts of the country. The main reason is, that their creameries sell their butter largely in their own neighborhoods, or very directly to consumers. One creamery, for example, sells over 300,000 lbs. yearly, in pound prints, to one man. This man brings his teams to the factory door, and takes about a thousand pounds of butter, six mornings in every week; and this is sold before night, and the money for it brought back when he returns the next morning. His customers are hotels, boarding houses and grocers or market men who retail directly to consumers. Correct business principles are thus applied; the highest possible prices are obtained, coupled with the lowest possible expense for delivery and commissions. There are, of course, many creameries so situated as to render any such plan impossible. But there are also a good many which do not even supply their own patrons with butter, and many more which

do absolutely nothing to cultivate and supply other local trade. Very many creameries which do nothing of the kind might find a desirable market for a large share of their product, within easy delivery distance for their own teams, or for one specially occupied in supplying the neighboring retail market.

Cheese factories rarely sell any of their product in their own neighborhood. They do not even supply their own patrons with cheese. Yet several cases are known in which factories have pursued an exactly opposite policy, with great advantage to all concerned. These have put retail wagons on routes in their vicinity and made cheese of various sizes, especially small ones for family use, and have sold to country stores and village grocers and from house to house whole cheese or cut cheese, working up a good trade, until, in some instances, the entire output of a factory has been disposed of to consumers in its own neighborhood. Results in such cases show net returns to factories of ten to forty per cent. more than otherwise obtained, cheese consumption locally much increased and the whole community supplied satisfactorily with this wholesome article of food at prices lower than ever before. Opportunities exist to do likewise, in hundreds of places, and cheese factories favorably located, may be confidently advised to follow these excellent examples.

There are also numerous examples of successful results from intelligent, enterprising, business-like efforts to cultivate and stimulate markets, both large and small, by adding to the usual dairy supplies new and varied forms of dairy products. Witness the development of the bottled-cream trade, and of the ice-cream trade, in many places, without the least interfering with prevailing supplies of other articles. And both of these—when well conducted—are most profitable branches of the dairy business. In almost any community which receives only the regulation allowances of milk, butter and cheese, it is possible, without disturbing existing trade, to build up an additional demand for dairy products by persistently offering, in attractive form, such articles as cream in various-sized bottles or jars, skim milk and buttermilk, pot cheese (smearkase), factory or Cheddar-made cheese in small sizes, or of extra quality, and other kinds of cheese, hard and soft. Also ice cream in family packages.

A familiar example is the general appearance within a few years, in markets of moderate size all over the country, of numerous fancy and foreign forms of cheese, and yet not one pound of these varieties of cheese, new in many localities, is now sold, where hundreds might find a market if proper business enterprise were to be applied to the extension of this trade. The same is true as to the Cheddar style of our regular factory cheese, made up in various sizes and shapes convenient to consumers. The current wholesale quotations of cheese in all our large markets show that "Young Americas," "Ponies," "Picnics," "Little Favorites" and the small sizes generally sell for higher prices than cheese of the conventional forms—flats and full sixty-pound sizes. Factories which make these small

cheeses, of good quality, are still comparatively few and generally behind in their orders. Some might be named which have established a good reputation in this line, which have a constantly increasing trade and at prices considerably above the market quotations.

Ice cream is one of the more recent forms in which milk producers and dealers have found it profitable to market their wares, and this business is susceptible of great development. Two examples will suffice: An enterprising Connecticut farmer who owned a herd of cows, producing very rich milk, had a line of private customers for his choice butter, which scattered in the summer and left him with a surplus of milk. He began making ice cream for his own and a few other families, gradually enlarged his circle of customers, mastered the details of the business and provided facilities for increased manufacture, established a wide reputation, and now his principal business is making ice cream. He has an excellent market for all the milk he can produce, and, during several months in the year, for the entire product of several good herds in his vicinity. This ice cream is sold only upon orders for delivery direct to consumers at most profitable rates. It is sent by express, in packages of all sizes, from a quart upwards, and in every variety of form and flavor. While rapidly outgrowing this limit, this case was originally and is still, in the main, one form of good business management for a farm dairy. The other example is similar, but upon a much larger scale—a creamery business instead of a farm dairy, finding a profitable market in the ice-cream trade. A New Jersey manufacturer, noting that farms which were productive or had recently been so, in a section of that State, were selling at very low prices, concluded that they offered opportunity for judicious investment. He bought several, stocked them with good dairy cows, rented some, operated others himself, and, as dairying had not been a specialty in that vicinity, he induced his neighboring farmers in various ways to keep more cows, so as to have milk enough within reach to support a creamery which he erected. Butter was made for sale in Philadelphia, in Trenton and in other New Jersey cities and towns. Under careful business management the enterprise prospered, and the profits of a successful pottery were invested in like manner in other farms and other creameries, and with similar results. Several localities, where farming had declined for lack of business methods, have, within a few years, become thrifty dairying communities under the lead of this progressive and public-spirited young man. Presently, as a new phase and development of the business, one of these creameries was set to making ice cream instead of butter. This was placed on sale in Philadelphia. Every effort was made to produce a choice article and sell it at the best advantage. A good market, already apparently well supplied, was stimulated to consume a large additional product. This whole group of creameries has been brought into the business, and everywhere in Philadelphia this ice cream is now recognized as leading the market, and some idea can be had of the extent of the busi-

ness by the recent purchase by this concern of \$10,000 worth of vanilla beans for flavoring its cream. Such enterprises are interesting, commendable and encouraging. They furnish a new dairy outlet and every quart of ice cream consumed is a relief, more or less direct, to the milk market, the cheese market and the butter market.

And even butter markets may be improved by similar means. Better prices can be secured and the consumption of butter increased by offering it in new and attractive forms. Where firkins and jars and rolls have been the custom, try prints, round or brick-shaped, made up and served with care and taste. Where prints have long been the usual form, try convenient family packages, like small jars and boxes of various shapes. (My own feeling is that putting butter into prints is a serious mistake. It involves a lot of useless work by the maker, and puts the butter into the form most liable to taint and injury. The smaller and fancier the prints, the more the labor and the greater the exposure. Much fine butter, as first made, has its choicest attributes impaired by the final and unnecessary working to put it into fancy form. It may be handy for a retail dealer to have his butter already in pounds or half pounds, weighed and separately wrapped, but if demanded for the benefit of the retail trade, let the blocks be perfectly plain, closely covered with strong parchment and packed snugly in boxes so as to avoid air spaces. The boxes should be clean and preferably used but once, new and non-returnable.) There is gratifying evidence in some localities of a growing demand for small family packages, in which the butter is solid, with the least possible surface exposure when opened. The old-fashioned two-pound roll is still the standard form for retail on the Pacific coast, and it has its advantages. If closely wrapped in paper instead of cloth, or a paper wrapper inside cloth, it is well protected, and only the end need be exposed to cut off a slice suitable for table use. A very attractive package, which promises to be popular, is an oblong box with slightly sloping sides, and lined with parchment. The butter slips out easily, in shape like a loaf of home-made bread, and the wrapper at one end can be opened and turned back to cut off a slice, then folded down and the block replaced in the box. These boxes can be made for two to ten pounds, and several may be placed in a crate for shipping. A good stroke of business has been done by some dairies and some creameries by meeting and encouraging the demand, still limited, for butter which is called "sweet," or entirely without salt. This style of butter, in some of our markets, brings an extra price. This fresh butter, which is sent in rolls, every few days, from the north of France, commands the very top price in the London market, usually retailing at five cents (or more) per pound higher than any other.

After all, the surest way to improve any market for butter is to offer butter of a better quality. There are always those who are seeking the best, want more of it, and are ready to pay for being satisfied. It is hardly necessary to dwell upon this old story of "room at the top," beyond

remarking that it applies with particular force to markets for all classes and kinds of dairy products.

Very encouraging results have attended business-like efforts to build up a retail trade of large size in buttermilk and skim milk, where supplies of these cheap by-products from creameries have been obtainable, and a considerable population of the industrial classes within a practicable serving radius. Sold in good condition, for just what they are, and at fair relative prices, the consumption of these articles can be rapidly and largely stimulated with very great advantage to the consumers and satisfactory profit to producers. Addition can thus be made to the income of creamery and cow owners, while supplies of most valuable food can be placed at low prices, within reach of many who need to practice every household economy. Experience shows that very large quantities of skim milk and buttermilk can be absorbed by the right kind of a community with a scarcely perceptible disturbance of the established supply of whole milk. The results are of great advantage to all concerned. The importance of markets for these by-products of butter making need no explanation or argument.

What has been said in regard to near-by or neighboring markets, when delivery can be made by the vehicles of the producer, may be applied with little modification to any market, no matter how distant, with which quick, regular and reliable means of transportation exists, and where producer and consumer can be placed in close communication. This close relationship and direct, or nearly direct, communication between the producer and consumer, or the consumer's immediate representative, is the important condition to be attained and retained. Farmers and factory men may thus have markets quite as good as those in their neighborhood, and sometimes better, if they deal directly with private families, public institutions, hotels, clubs and retail dealers, to whom they can send in a satisfactory way their milk, cream, butter and cheese. Reference has already been made to a farmer who supplies ice cream to families and others at long distances and widely separated points. A dairy farm in Massachusetts, beginning with a select family trade in bottled cream in the city of Boston, has grown to be a large and prosperous dairy company. The Standard Butter Company in the State of New York, owning several creameries, does a very large business in supplying by direct shipments, weekly or oftener, numerous hotels, restaurants and similar consumers. Hoard's creameries in Wisconsin do a similar business, supplying direct from the creameries, in packages of all sizes, butter for several hundred families, clubs and hotels, at distant points. Creameries in Iowa and Minnesota might be named which have their entire output engaged a year or more in advance by first-class grocers or other merchants who retail the butter at the highest local prices. Such desirable customers can only be secured by convincing them that they will receive a regular supply of butter, uniform in quality and of a standard suited to their par-

ticular wants. Some cheese factories are able to meet like requirements and thus sell all their cheese directly to the retail trade.

The advantages derived from disposing of the products of farm dairies, creameries or factories, in the manner described, are very marked and mainly self-evident. The most important will be briefly noticed: (1) Direct communication enables the producer to become familiar with the tastes and preferences of his customers, so as to better comply with wants which are likely to be varied and may be peculiar. It is unquestionably the duty of the producer, and should be his endeavor to satisfy his customers in every particular, to make his products conform to their wants, rather than try to force them to accept his own ideas. Too many make this mistake and suffer for it. It is better business to cater to customers' wants, or even whims, and make them pay for it. Occasionally there may be reason for doing missionary work in the way of educating the tastes of families or communities, but the work demands caution and skill, and one must not expect early profit from such efforts. (2) Intimate acquaintance with the retail market, its requirements and changes, has a desirable stimulating and educating effect upon the producer and tends to improve his work. (3) The chief pecuniary gain in direct dealings with consumers or retailers is in saving much of the cost of middle men. In all branches of dairying this must be done as much as possible. When the owners of cows receive for the milk produced only a half or less than a half of what the consumers pay for that milk or its products—often, indeed, little if any more than one-fourth—the necessity is recognized for strenuous efforts to obtain a larger share for the producer. In many cases middle men are necessary to speedy handling, transportation, distribution and safe returns. But in the dairy business they may fairly be regarded as a necessary evil, to be abated as much as possible. Dairies and factories are to be thoroughly pitted which feel themselves unable to do better than send their products to distant commission houses and take whatever comes back, remaining ignorant of the relative position of their goods in the markets and the opinions of those who ultimately consume them. Every exertion should be made to bring producers and consumers nearer together, to their mutual benefit. And middle men should not complain; there will inevitably remain much for them to do.

More and more is being done every year, in the direction indicated. Areas and localities for consumption are being more and more directly supplied, with economy in transportation and a reduction in the number of persons who levy toll on dairy products during distribution. It is in this development of the business that sellers who control large quantities of products have great advantage. Large creameries and combinations of creameries and factories are able to ship in carload lots to furnish the entire supply to moderate-sized markets, and they hold strong positions of vantage in the large markets.

There are a good many places still in this country where the consumption of butter and cheese is limited, because the supply is indirect, irregular, unreliable and unsatisfactory as to quality. At such points business enterprise may develop desirable markets. These opportunities should be found and taken advantage of by the direct representatives of the big creameries and cheese factories. It is no credit to the business capacity of American dairying as a whole to find people in so many places complaining that they can not find a supply of good butter and cheese in their local markets. The possibilities for developing home markets and stimulating the consumption of butter and cheese, especially cheese, within the confines proper of the United States, are so great that they certainly deserve attention before much concern is given to foreign trade.

Foreign trade has proved advantageous at times, and foreign markets are not unlikely to be more useful to American dairying in the future than in the past. This country has always exported more or less butter and cheese—sometimes more and sometimes less. Just at present our export trade in dairy products does not amount to much. Our own people seem to be using about all the butter and cheese made in the country, although the prices realized in our home markets are not altogether satisfactory. This is particularly true of cheese. An active foreign market for American factory cheese would now be most acceptable. We had such a market once, and lost it by our own fault, so we have no right to complain.

Finding it easier to get British cousins to take our cheese than to teach our own people to use more of it, we built up a foreign trade in cheese rapidly soon after the general adoption of the factory system. The export of twenty million pounds in the year 1861 was steadily increased until it became 148,000,000 in 1881. Great Britain took nearly all of this, and from 1870 until 1882 the export price at New York averaged about 12 cents a pound. In those days all the large English cheese houses had branches in New York, and at one time there were forty foreign cheese buyers located there. Canada was doing nothing in cheese making up to 1870, and for a long time bought cheese by the million pounds every year from the United States. Then came the era of filled-cheese making in this country. We sent large quantities of counterfeits to be circulated among our best customers, until they became disgusted with the fraud and suspicious of any cheese bearing an American mark. There was no interference with these frauds by State or Nation until the mischief was done. Our exports of cheese fell off as fast as they had grown, until we sent over only 36,000,000 pounds in 1896. From this lowest point we have recovered a little. During 1897 we exported 60,000,000 pounds, and shall probably export during (the calendar year) 1898 about 48,000,000 pounds. Meanwhile Canada forged ahead, increasing her output of cheese, improving its quality, and wisely preserving her reputation and gaining the confidence of her customers by absolutely prohibiting all counterfeit cheese and sending nothing but full-creams abroad. As a result, she proved once more that honesty is the best policy. Canada gained in the

British cheese markets all that this country lost, and even more. Beginning in 1873 where we started twelve years earlier, her exports reached 60,000,000 pounds in ten years, and have grown to 165,000,000 pounds in 1896 and also in 1897, which is more than this country ever sent from home. The position of the two countries is further reversed, because the States cheese at one time stood at the head in British markets for quality and price, while Canadian cheese now holds that position, and the general American factory occupies a second place. It is truly humiliating to know that of the 51,000,000 pounds of cheese sent from the United States to Great Britain last year, 13,000,000 pounds was exported by way of Canada, this being the very best of our make, taking that route to improve its credit by passing through the hands of Canadian exporters and traveling in company with Canadian cheese, if, indeed, as there is reason to fear, it did not go into market finally under false colors, as the produce of the Dominion. (During the first ten months of 1898, out of 34,000,000 pounds of cheese sent from the United States to Great Britain, 12,000,000 went by way of Canada.)

The opinion has been already expressed that the efforts of our cheese producers should be first directed towards developing increased consumption of this most valuable and economical article of food in our own country. But it is interesting to inquire what can be done towards regaining a leading position for American cheese in British markets, if those continue better than our own.

Men who have bought American cheese for foreign markets for a generation, of whom a few remain, seem to be of the opinion that such recovery will be very difficult. They give a discouraging reason for the principal one, namely, that while there are small lots of really fine cheese to be found in this country every year, the bulk of the output of our factories, although straight, full-cream cheese, is inferior in quality to the average of twenty years ago. They complain that the general run of cheese in these days lacks in body and finish, is too watery and poorly cured, and does not keep well. The large buyers in Great Britain have always been speculators more or less, holding their cheese for favorable terms in the market. Hence, if American cheese lacks keeping quality, they don't want it. Inquiries among select retail merchants in our domestic markets, and among their best customers, sustain the views of the exporters. The consumption of cheese in this country, which suffered such a decline because of the general disgust and distrust engendered among merchants and consumers by the filled-cheese frauds, has failed to recover mainly because people claim they are unable to find cheese as good as that they got years ago. The evil of "skims" and "part skims," which remains unabated, and which is just as much a fraud, in many instances, as the filled-cheese nuisance was, is doubtless partly responsible. But even the honest goods, protected and guaranteed by State registry and brands, do not give satisfaction to discriminating buyers. The trouble seems to be that cheese makers and factory managers sacrifice quality to their imme-

diate personal interests and the importunities of patrons in getting greater quantity. Making for so much a pound, or ambitious to return the largest possible quantity for the milk received, too much cheese is made per 1,000 pounds of milk; then it is soft and watery, falls to develop texture and flavor, and does not cure well. There is also the anxiety to get quick returns for patrons or proprietors, which causes the curing to be hurried up, and the cheese put upon the market much sooner than it should be. Consequently there is a large output of soft, negative-flavored, ill-cured (or quickly cured) cheese on our markets which fails to satisfy either the best home trade or the foreign demand, and accordingly brings a low price. Just one illustration: A prosperous dairyman of three score years, who has always been a lover of good cheese, has known how it was made, and been able to get what he wanted until within recent years, chanced to be in Herkimer County (New York) last October, and on visiting an old friend who manages a factory, asked if he could not get there a real good cheese for family use during the winter. At the same time he described what he wanted—"one of the old-fashioned kind, rich, but so firm and dry in texture that it would squeak between the fingers, of a clean, fine, yet decided flavor, and so thoroughly cured that it would keep good all winter, if not improve." His friend understood the case, but was sorry that he could not furnish the article; he said that they only made up about one vat in the season of that kind now, just for the use of a few families connected with the factory. Such cheese required eleven, twelve or perhaps thirteen pounds of milk to a pound of cheese, and they did not make it any more for the general trade. Comment is unnecessary. If we want to induce our own people or our British cousins to eat more American factory cheese, and pay a good price for it, our factories must make better cheese.

Regarding the export of butter from this country, the fact is that with few exceptions the American butter sent to foreign markets has been of such low grade that until within a year or two merchants in other countries have never thought of the United States as capable of furnishing fine butter. Enterprising dealers in New York and Boston were the first to try to find a place for any considerable quantity of States creamery butter of high grade in British markets. Under Secretary Willson's direction, the United States Department of Agriculture has been following up this good beginning for two years for the purpose of establishing a reputation in foreign markets for fine American butter, and in order to obtain detailed information as to the wants of these markets and the best way of supplying them, which facts could be made public for the benefit of all interested. Two and three years ago it looked as if a surplus of first-class creamery butter was appearing in our large domestic markets, so as to render important some new outlet for this commodity. During the calendar year of 1898, however, there has been no such surplus. Our own people have taken up all the good butter which has come to market as

fast as it appeared. This is partly accounted for by a decreased production—probably temporary—and partly by an increase in consumption, despite a rise in price; this is also likely to be transient.

There can be no doubt that the supply of creamery butter of the better grades is increasing in this country faster than any present or probable home demand. Consequently a surplus may be looked for in the near future, and in view of this the present work of the department in seeking to establish new markets is timely and may soon bear fruit.

The markets of Great Britain are far more attractive than any others across the Atlantic whenever we have good butter to export, and provided the relative conditions are as favorable as usual. Just at present and for some months past market relations have been such as to induce no exports. Butter has sold for as much in New York as that of like quality in London, and sometimes more. France and Germany have been investigated, but without encouragement. Duties must be paid to enter either country, and when entered the markets are not found as good as those of England. Next to Americans the British are the greatest butter-eating people in the world. Great Britain is using almost a million pounds of butter a day, and her consumption of this article is increasing at the rate of 10,000 tons a year. This new demand is a nice little contract to bid for, if prices are right. But the British merchants and consumers must be convinced that butter from the United States will satisfy them before they buy here. It is in this direction that the United States Department of Agriculture has been working. And some facts of interest have been ascertained. The minor points of color, salt and form of package have been so much discussed and are so easily controlled that it is useless to spend time upon them now. But one important matter has been demonstrated—the general run of American creamery butter of the best grades will not satisfy the British markets well enough to compete with Danish butter, which, there, holds the lead. The same fault may be found with our creamery butter makers as with American cheese makers. They hurry their work too much—seem too anxious to save labor and get their goods quickly to market. Consequently the butter is too soft and watery and does not answer the requirements for good body, for which Danish butter is noted. Even where it does not really contain too large a percentage of water—as much of it does—it lacks the finish in making, which incorporates this water so thoroughly as to make the butter appear firm and dry.

My own belief is that there is a general tendency to wash too much, work too little, and hurry the butter too quickly into the tub. I am also inclined to think that the combined churns must share in this fault. Then there has been an unfortunately growing demand on the part of "the trade" for a high or quick flavor, at the expense of texture or body. This latter all-important property of good butter seems to be largely lost sight of in the modern craze for high flavor. Judges at butter shows or com-

petitions have helped on this evil by giving undue value to flavor, in many cases paying little heed to other points. I can find no satisfactory evidence that consumers demand this high and transient flavor or are willing to accept it at the expense of texture. On the other hand there is general complaint of a lack of that substantial quality which we term firmness of body, dryness and good texture. Many close observers agree that while, in all parts of the country, there is far less bad butter and less poor butter in the general supply than formerly, there is also less really fine butter to be found than some years ago. Want of firmness in texture and fineness in grain is the general complaint.

In order to compete with the Danish, Swedish and best French butter, as found in Great Britain, the American creameries must pay more attention to finish, and make a firmer, dryer, finer-grained butter. Half a dozen times the department has given orders to buy at any price a ton or so of the very choicest creamery butter to be found in the New York market. Every time the export of this butter has been a comparative failure; it has ranked in England with Irish and Australian and second-grade Canadian, and brought two or three cents a pound less than expected. The high flavor has been reported lost or "off," notwithstanding ocean refrigeration and the best care in handling. And complaint has been made of the apparent excess of moisture ("too much liquor"), the lack of body and unsuitableness as to color, salt and package. But by having selected creameries make butter expressly for export, working twice with an interval of some hours between, giving a fine, clean, mild flavor, lasting rather than flashy, with other points as per order, the British buyers have been satisfied, and the butter accepted and used among discriminating consumers in place of the best Danish. (Our latest reports are of butter of this character, sent in fifty-six-pound boxes of a modified cube in shape, selling in Manchester, England, the last of November, at 25½ cents per pound wholesale. It cost about 1½ cents a pound to get this butter from the cold storage house in New York to the British market.)

Large, important and attractive as are the butter markets of London, Manchester and Liverpool, Secretary Wilson does not propose to stop there in his search for new outlets for our dairy products. As stated, the continent of Europe has been already visited by a special agent of the dairy division, and further attention will be given to that quarter. It is proposed to make a particularly fine display of American products at the Paris Exposition of 1900. Arrangements are in progress for testing the markets of the West Indies as soon as business becomes more settled in that region. An agent has already been dispatched to South America seeking markets there. Preparations are making for experimental exports from the Pacific Coast, north, south and west. A special agent has visited Hawaii and Japan and selected commercial agencies there, and is now in China on his way to the Philippines. He writes from Japan:

"These people are beginning to learn to like butter, but I have not been able to find a pound of good American butter here." He found an agent from Canada introducing butter to the principal Japanese cities. Consul-General Gowdy expresses the opinion (from Tokio) that by sending over good butter, properly and attractively prepared for table use, the Americans can control the markets of Japan.

We read of the countless millions of inhabitants of the Mongolian countries and the islands of the east, and can figure enormous prospective markets if those people can be taught to eat something as we do. But races that have subsisted principally upon rice and sorghum seed for centuries can not be expected to materially change their diet in a generation. Nor will their purchasing power amount to much while their labor commands but a few cents a day. Further, although whole milk and skim milk in all forms—and cheese used as food rather than condiment—are most nutritious and economical articles of food, it must be remembered that cream and butter are really luxuries, without much food value, and can only be expected to be largely consumed by highly civilized people, capable of free expenditure upon a generous diet. "Every little helps," and we may as well try to supply the small markets in South America and on the islands of the sea, instead of leaving them to our enterprising Canadian neighbors. But, after all, the main dependence for enlarged markets for our butter and cheese must be upon increased consumption in our own country and in growing wants of other English-speaking people.

However much good work may be done, official and private, to establish a high reputation for the dairy products of the United States, this may all be soon destroyed, as was our valuable British cheese trade, by unscrupulous merchants, who for temporary gain may export low-grade and counterfeit goods, marked in all respects like the best. There is now nothing to prevent such injurious action. Hence the Secretary of Agriculture, upon the recommendation of the Dairy Division, has, in his last annual report, advised that Congress be asked to extend (with suitable modifications) the existing system of government inspection and certification of meats and meat products for export, to include butter, cheese and condensed milk for export from the United States. The Danes, Australians and Canadians have adopted such precautions, and profit thereby. It is proposed to authorize competent inspectors to affix such brands as "pure butter" and "full-cream cheese" to products which are above a fixed minimum standard of quality. Inspection of this kind, duly legalized and properly executed, would place the good butter and cheese of this country in foreign markets under the identifying label and guarantee of the United States Government. While similar merchandise of lower grade would be left free to find place for itself upon its own merits, the fine goods, entitled to and receiving the official indorsement, would be justly given great commercial advantages.

Mr. Schlosser: Did I understand you to say that the cause of the lack of texture and firmness in butter is largely due to the use of the combined churn?

Major Alvord: I expressed the opinion that, according to my observation, the combined churn must share in this present fault of our creamery butter. That is an individual opinion, and I do not care to discuss churns.

Mr. Schlosser: Could I ask you what your objection to the combined churn is, Major Alvord?

Major Alvord: It delivers the butter in an unfinished condition, containing too much water.

Mr. Schlosser: You advise a long box churn?

Major Alvord: I would not go beyond that point at present; I advise making better butter somehow.

Mr. Thomas: We have no creamery in Bartholomew County, and no market only as we make it. I bottle my cream and retail it in our county town, and I have been now five or six years working up a little trade for my own butter there, and in summer making ice cream. The question is, What shall I do with the ice cream when it becomes cold weather? The cows keep pouring the cream down and the people don't want the ice cream. I make some butter and I sell all the buttermilk I make, and then don't have enough. I think I can work up a little trade for just simply sour milk for cooking purposes.

Major Alvord: How about sweet skim milk among the people you sell your cream to?

Mr. Thomas: I haven't much benefit in that direction. Our town is pretty well supplied with whole milk. I find that pigs like skim milk first-rate and calves do pretty well on it, too.

Major Alvord: I can't advise anybody to sell their skim milk. I do not know of any price paid for skim milk by anybody that is equal to the price it is worth to the pig and calf when used at home. I believe with the speaker that if he has a good cream trade, that is the thing he wants to hold on to, and I believe he had better risk his butter customers than to surrender any portion of his cream trade. While I would not want to make this suggestion to his customers, yet I might just whisper across the room that I have known of such cases where in the summer time the cream trade has sprung up, and he might find some neighbor or creamery in reach who makes almost as good butter as himself, and he might in that way settle with his customers pretty satisfactorily with butter from these neighbors or creameries, and in that way hold on to your cream trade. What can cream be retailed for in this State?

Mr. Thomas: I put it in bottles and retail it at ten cents a pint. Where I sell a gallon or more I make it at seventy cents per gallon.

MILK IN ITS RELATIONS TO CHEESE MAKING.

BY L. L. VAN SLYKE, PH. D.,Chemist of the New York State Agricultural Experiment Station, Geneva, N. Y.

Oliver Wendell Holmes was once asked how early the training of a child could be commenced to advantage. He replied that, in his judgment, training had best begin as far back as its grandfather and grandmother. In a similar manner, the study of fundamental questions relating to the manufacture of cheese can be carried back advantageously not only as far as the mother substance of cheese, the milk, but even farther back—to the cow, the dairyman, the food, and even the soil, water and air of the farm.

The intimate and necessary relation existing between milk and cheese has been practically ignored until within ten years past. So far as milk and cheese were studied at all, they were, for the most part, studied as materials that were not intimately connected. This was undoubtedly due to the fact that attention was given only to methods of manufacture and but a little, or not at all, to the general principles underlying those methods. Hence, it is only recently that we have come to have any accurate knowledge in regard to such questions as the relation of fat and casein in milk to yield and quality of cheese, the character and extent of losses of milk constituents in cheese making, their causes and remedies, and similar questions of fundamental importance.

In the preparation of this address I have made an effort to keep prominently in mind the interests of the milk producer, as they are related to this subject, and I shall, therefore, speak to him rather than to the cheese maker. If only milk producers would do their part of the task properly, the work of the cheese maker would be comparatively easy.

At the outset I am going to tax your attention for a short time with some preliminary statements which may be rather dry, but which are necessary as furnishing a starting point for this discussion.

The one central thought which I wish to keep in mind is embodied in the following questions: What kind of milk shall I produce to best advantage for cheese making? Why? How?

In connection with the kind of milk to be produced for cheese making, we must consider two points—first, its composition, and, second, its condition.

COMPOSITION OF MILK AS RELATED TO CREAM.

What has the composition of milk to do with cheese making? Ten years ago the almost universal answer among milk producers would have been "nothing," because it was generally believed that, for the production

of cheese, milk is milk, and that 100 pounds of one milk would make the same amount and quality of cheese as 100 pounds of any other milk.

Of the several compounds contained in milk there are two, and only two, which are of special importance as cheese-producing materials; or, stated in another way, the cheese-making power of milk is almost entirely governed by two of its solid constituents, so far as the composition of the milk is concerned. These two constituents are fat and casein. The other compounds of the milk, such as albumin, sugar, etc., pass into the whey and are, for the most part, lost, so far as regards ordinary cheese production.

The query may suggest itself, "Is not water one of the prominent constituents of both milk and cheese?" It is, but the amount of water in cheese is quite independent of the amount of water in the milk from which the cheese is made, provided the milk be normal. The amount of water retained in cheese depends upon the conditions of manufacture, and the cheese maker has it in his power to retain more or less water in his cheese, regardless of the composition of the milk, so long as the milk is normal. Even milk producers who water their milk do not defend their action on the ground of wishing to increase the yield of cheese. In studying the relation of the composition of milk to cheese making, we need, therefore, consider only fat and casein.

The fat that forms so large a part of natural butter comes from the fat in milk, and it is this same milk fat that forms the fat of cheese.

Casein, in an impure form, is familiar to every one in the form of curdled milk. When milk sours, a white solid substance or curd forms and this substance is called casein. In using the term casein we do not include albumin, as is commonly, though erroneously, done; but refer only to the compound that is coagulated by rennet and retained in the cheese. A considerable part of separator slime is milk casein.

These two cheese-making constituents of milk occur in varying quantities in different milks. Milk fat may vary in milk coming from herds of cows from 3 to 5 per cent., the average being somewhere between 3.75 and 4 per cent.

Casein in milk varies from below 2 to over 3 per cent. in the milk of factory cows and averages about 2.50 per cent.

Now, taking fat and casein together, we find that these two cheese-making constituents rarely go below 5 or above $7\frac{1}{2}$ pounds in 100 pounds of cheese-factory milk. Roughly, we may say that the cheese-producing solids of the milk vary from 6 to 7 pounds, and average $6\frac{1}{4}$ pounds in 100 pounds of milk. Each pound of cheese-making solids, fat and casein, taken together, produces approximately 1 2-3 pounds of cheese.

It must follow, then, that the yield of cheese from 100 pounds of milk depends, primarily, upon the amount of cheese-producing solids in milk—that is, upon the composition of the milk; and since these vary, the cheese yield varies also. This is one of the reasons and the chief one showing why different milks produce unlike cheese yields.

It may be objected that this conclusion does not necessarily follow from the premises, and that, whatever may be the composition of the milk, the fat and casein do not all go into the cheese.

The objection generally presents itself in two propositions—first, that it is impossible to retain the fat of milk in cheese, when the milk fat exceeds $3\frac{1}{2}$ or 4 per cent.; and, second, that the amount of casein is practically constant in all kinds of milk. No one ever proved the truth of these assertions; they were assumptions, pure and simple.

Careful and extended investigations have clearly proved that neither of these assumptions is true. Here is a tabulated summary, representing averages obtained from a large number of experiments carried on on a commercial scale, with normal factory milk varying in fat content from 3 to $4\frac{1}{2}$ per cent.:

Pounds of Fat in 100 Pounds of Milk.	Pounds of Fat Lost in Whey for 100 Pounds of Milk.	Per Cent. of Fat in Milk Lost in Whey.
3.0 to 3.5	0.32	9.55
3.5 to 4.0	0.33	8.33
4.0 to 4.5	0.32	7.70

An examination of the figures in the middle column shows that almost exactly the same amount of fat is lost in the whey for a 100 pounds of milk, whether the milk contains 3 per cent. or more of fat.

Looking at the figures in the last column, we see what proportion of the fat present in the milk was lost in the whey. Thus, when the milk contained 3 to 3.5 per cent. of fat, 0.32 pound of this fat was lost for 100 pounds of milk, which was 9.55 per cent. of the amount of fat in the milk. The proportion of fat lost grew less and less, as the milk became richer in fat.

In regard to the second assumption referred to above, viz., that the amount of casein is practically constant in all kinds of milk, we can say that our own work and the work of others does not justify the statement. As a rule, when milk fat increases, the casein also increases and approximately in the same proportion, until we reach milk containing over 4 or $4\frac{1}{2}$ per cent. of fat, and then the fat increases somewhat more rapidly in proportion than the casein. The following figures indicate about how the fat and casein are related to each other in normal milk:

Per Cent. of Fat in Milk.	Per Cent. of Casein in Milk.
3.00	2.10
3.25	2.20
3.50	2.30
3.75	2.40
4.00	2.50
4.25	2.60
4.50	2.70

It will be well to go one step further and show at this point how the yield of cheese increases when the per cent. of milk fat increases:

Per Cent. of Fat in Milk.	Pounds of Green Cheese Made from 100 Pounds of Milk.
2.80 to 3.00	8.60
3.00 to 3.25	9.05
3.25 to 3.50	9.50
3.50 to 3.75	9.95
3.75 to 4.00	10.40
4.00 to 4.25	10.85
4.25 to 4.50	11.30
4.50 to 4.75	11.75
4.75 to 5.00	12.20

In average cheese-factory milk, the approximate amount of green cheese that can be made from 100 pounds of milk is found by multiplying the per cent. of fat in milk by 2.7.

It will be of additional interest to study for a moment the distribution of milk constituents in cheese making, taking cases that have occurred in actual practice in our work of investigation. This will enable us to see what becomes of each milk constituent in cheese making and why more cheese is made from richer than from poorer milk.

TABLE SHOWING DISTRIBUTION OF MILK CONSTITUENTS IN CHEESE MAKING.

	Pounds.	Pounds of Water.	Pounds of Solids.	Pounds of Fat.	Pounds of Casein and Albumin.	Pounds of Sugar, Ash, etc.
Illustration I—						
Milk	100.00	88.53	11.47	3.05	2.60	5.82
Whey	91.46	85.41	6.05	0.24	0.61	5.20
Cheese	8.54	3.12	5.42	2.81	1.99	0.62
Illustration II—						
Milk	100.00	87.10	12.90	4.00	3.23	5.67
Whey	89.36	83.12	6.24	0.32	0.79	5.13
Cheese	10.64	3.98	6.66	3.68	2.44	0.54
Illustration III—						
Milk	100.00	85.23	14.77	5.00	3.48	5.89
Whey	86.60	80.23	6.37	0.31	0.90	5.16
Cheese	13.40	5.00	8.40	4.69	2.98	0.73

Attention is called to the following points in connection with this table:

1. The yield of cheese increases as the milk becomes richer.
2. The amount of water in 100 pounds of milk is retained to a greater extent in the cheese as the milk increases in richness or decreases in its water content.
3. The amount of milk solids retained in the cheese increases as the milk grows richer.

4. The amount of fat lost does not increase in proportion as the milk increases in richness.

We are now in position to answer, in part, the question proposed at the outset—What kind of milk, as to composition, is it best to produce for cheese making, and why? In a general way, the answer is, the milk that produces most cheese; in more detail, that milk is best for cheese making, from the producer's standpoint, when it contains the largest amount of fat and casein. We might even go further and say the milk that contains most fat is the most profitable for cheese making, provided, first, that the milk is paid for according to the fat content, and, second, that the price of butter is not relatively higher than that of cheese, points to which attention will be given later.

Now, why is it better to produce such milk for cheese making? The answer is simple and convincing, because it pays better. In general, it costs less to produce a pound of fat in rich milk than in poor milk. Here are some facts bearing on these points. At our Experiment Station in Geneva, N. Y., we have studied the value of several different breeds of cows with reference to their comparative value for cheese production. I will present some of the figures obtained in our work. The results represent the averages of several cows for one period of lactation:

	Holstein.	Ayrshire.	Guernsey.	Jersey.
Per cent. fat	3.36	3.60	5.30	5.60
Cheese yield per cow	755 lbs.	681 lbs.	703 lbs.	687 lbs.
Cost of Cheese per pound	6.75 cts.	7.25 cts.	6.60 cts.	6.60 cts.
Profit per cow	\$12.02	\$7.00	\$13.87	\$13.42
Relative profit	172	100	198	192

The profits given above are based upon the assumption that the cheese all sold for one price.

Now, it has been fairly well established that the relation of fat to casein in cheese governs, to some extent, the commercial quality of the cheese, provided, of course, other conditions are uniform. How closely dependent quality of cheese is upon the relation of fat to casein we can not say definitely. Starting with one extreme, we know that the character of skim-milk cheese is very different from that of whole-milk cheese. The difference in composition is mainly a difference of casein and water and fat. The skim-milk cheese is rich in casein and water, but poor in fat. Normal cheese is richer in fat and poorer in water and casein. In quality we know that skim-milk cheese is poor. We also know that cheese made from milk containing added cream is superior in flavor to that made from ordinary normal milk. As a rule, cheese made from Guernsey or Jersey milk can be expected to be superior in quality to that made from ordinary Holstein or Ayrshire milk. As a rule, the greater the fat in proportion

to casein, the better the quality of cheese. Cheese buyers know nothing about the relation of fat and casein in cheese, but their method of classifying and grading cheese agrees in a general way with the facts developed by chemical analysis.

In the table following is given data to show the general difference existing in composition of cheeses made from different kinds of milk.

Kind of Milk..	Per Cent. of Fat in Milk.	Per Cent. of Water, Acid, etc., in Cheese.	Per Cent. of Fat in Cheese.	Per Cent. of Casein in Cheese.	Pounds of Fat for One Pound of Casein in Cheese.
Holstein. . .	3.36	40.26	35.24	24.50	1.44
Ayrshire . . .	3.60	39.85	35.95	24.20	1.49
Guernsey . . .	5.30	37.25	40.63	22.12	1.84
Jersey. . .	5.60	37.06	41.65	21.94	1.89
Skim-milk . .	0.25	54.87	3.33	32.75	0.10

CONDITION OF MILK.

I now take up the second point, as to the kind of milk to produce for cheese making, which I called the condition of the milk. I use the word in a broad way with reference to cleanliness. When milk contains foreign matter of any kind, especially dirt, it is usually called "tainted," particularly when peculiar, abnormal smells come from the milk. This term is used to cover a variety of conditions due to different causes. In general, the most common cause of tainted milk is lack of cleanliness in milking and caring for milk. Other causes are unhealthful food and drink for cows, unwholesome surroundings, and some abnormal condition of the cow produced by disease or improper treatment. Impure water, especially in dry seasons, is a common source of this trouble.

In connection with cheese making, a distinction should be made between two general classes of tainted milk—first, taints produced by physical absorption of odors previously existing, and, second, taints produced by the action of living germs present in the milk. The first kind results from keeping milk in a close, unclean stable after milking or in any place where the milk may come in contact with air loaded with offensive odors. Under this head would be classed taints coming into milk from food eaten by the cow, or resulting from some abnormal condition of the cow. When a taint appears in milk very soon after milking, it is in all probability due to the absorption of odors.

The second class of tainted milk is usually the one that annoys the cheese maker most. The germs or micro-organisms which get into the milk produce undesirable forms of fermentation. The taints due to this cause do not usually reveal themselves until the milk has been drawn some hours, usually not for twelve hours or more, according to the conditions of temperature under which the milk is kept.

Now, why should milk for cheese making be produced with the utmost care to avoid all kinds of taints? In general, because it doesn't pay to

produce tainted milk, and it doesn't pay because good cheese with a good yield can be made only from clean milk. Tainted milk is and always has been the curse of cheese making; and it is an uneasy ghost, haunting and making miserable the life of competent men, to say nothing of the incompetent ones. Tainted milk is to blame for more inferior cheese than all other causes put together. In making tainted milk into cheese, more fat and casein are lost than in working with normal milk. So we have not only a decreased yield of cheese, but usually a yield of very inferior cheese. Another annoying feature of this kind of milk is that a single can furnished by one patron may injure thousands of pounds of other and pure milk, with which it is mixed, thus causing financial loss to every other patron; and no one is a guinea, unless it may be the germs.

We have now considered what kind of milk it is desirable to produce for cheese making, considering both composition and condition of milk, and we have also indicated why it is desirable to produce rich milk in a clean condition. It remains to consider how such milk can be produced.

PRODUCTION OF CLEAN MILK.

How can we produce clean milk reasonably free from taints of all kinds?

1. There must be readily accessible on the farm an abundant supply of pure water. The idea prevailed once, and does to some extent now, that the best dairying can be done only in hilly regions. This supposed fact has been attributed to peculiarities of soil and to pure air, and also to the character of the water. This last cause is undoubtedly a prominent element in the matter, allowing its truth. A farm, located on low lands, furnishing only stagnant mud puddles or swamps as a source of water supply for cows, is an unfit place to produce milk for cheese making. If you can't furnish your cows pure water, don't try to produce milk for any purpose. In too many cases, where the water supply could easily be kept pure, it is neglected and allowed to come into contact with decaying vegetable and animal matter, as when a barnyard is made to drain into a brook or pond. In dry weather, when water supplies run low and become impure, we find cheese makers in great trouble, caused by tainted milk. When we stop to consider that there are over 87 pounds of water in 100 pounds of milk, we can see the importance of a pure source of supply.

2. The milk of diseased animals should not be used, nor of animals fresh in milk, before the ninth milking.

3. Foods having marked odors, like silage, should be fed only after milking, and then at once, and none should be left in the stable. Dry fodders, which furnish dust, should likewise be fed after milking. In general, the stable should be as free as possible during milking from all marked odors and from dust.

4. Clean flanks of cows by brushing and sponging with clean water before milking, leaving it somewhat moist, but not dripping at all. The

hands of milkers should be carefully washed just before milking, and should never be wet during milking.

5. Only clean tin pails, free from rust and patches, should be used.

6. As soon as milk is drawn from each cow, remove the milk from the stable to some room free from all odors and with cleanly surroundings. Strain the milk through several thicknesses of cheese-cloth, washing the strainer after every milking, first in tepid water, and then boiling in water and drying.

7. Aerate the milk at once after milking, some special form of aerator being preferable to stirring, dipping and pouring. Then cool milk at once to 70 degrees F., and hold at this temperature until taken to the factory.

8. In carrying milk to factory, have the cans as full as possible, to prevent churning of fat, and protect cans from dust and sun by some kind of covering.

9. Never carry whey in the same cans used for transporting milk to the factory. Clean the cans as soon as they reach the farm from the factory, rinsing first in warm water, then cleansing thoroughly and exposing in sun to dry, inverting so as to allow circulation of air.

It is possible to produce clean milk only by painstaking care and constant vigilance. Only clean milk should be produced for milk selling or butter-making; but it is even more important that only the best milk shall be furnished the cheese-maker, if we expect him to make good cheese.

PRODUCTION OF MILK OF HIGH-GRADE COMPOSITION.

What shall we call or how shall we define high-grade milk for cheese-making? In general, we may say milk that contains 4 to 5 per cent. of fat as the average of the lactation period. The problem before each dairyman who produces milk for cheese-making is this: How to produce, not quantity of milk alone, but increased quantity of milk-fat. Hence the problem becomes one of producing an abundance of fairly rich milk, if larger money returns are to be secured. As a rule, it costs less to produce a pound of fat in milk containing 5 per cent. of fat than it does a pound of fat in milk containing 3 per cent. of fat. It is important to keep in mind that it is not alone richness of fat that we must have, but also quantity of milk-fat. The problem, then, is so to control the composition and yield of the milk that we shall get the largest amount of milk fat most economically.

In order to find out how this can be done, we must consider some of the elements that influence and determine composition of milk.

Primarily, the individuality of the cow fixes her ability to produce milk of poor or rich quality. Individuality is determined by inherited characteristics. In other words, the ability of a cow to produce poor or rich milk depends primarily upon her breeding. If we wish to produce richer milk, we must come back to this starting point.

Then comes the important element of feeding, and next, care, which covers everything not covered by breeding and feeding.

I am aware that all this is not at all new, but it is all just as important and just as true as if you had never heard it before, and perhaps more so.

In milk production, I want to impress strongly one point which is commonly lost sight of by most dairymen, and that is the great necessity of keeping up the flow of milk. This can be done to best advantage only by a wise use of succulent foods. There is a special field for application in seasons of drought, and nearly every summer season has its dry spell. Such serious shrinkage occurs in milk yields in dry spells, in case of cows at pasture, that very serious loss is often sustained. In a special case which he studied in New York we found a loss of not less than five dollars a cow, caused by drought during July and August. Not only did the yield of milk decrease, but the composition of the milk was so affected that it made less cheese. In the special case studied, the cows of one cheese factory, numbering almost six hundred, produced 360,000 lbs. less of milk and 42,000 lbs. less of cheese than they would if there had been plenty of fresh pasturage. How can we fight the effects of drought? Simply by having on hand a supply of succulent, nutritious food with which to supplement our pastures. Time permits me only to hint at the details. Among the most effective fodders, we have found oats and peas; alfalfa and corn silage. Silage has the advantage of being on hand, if enough is put up to hold some over. In case of a severe drought in June, our oats and peas and similar crops might fail, in which case we should have the silage. Bear in mind that keeping up the milk-flow means keeping up the yield of milk-fat and the money-flow.

COMPARISON OF BUTTER AND CHEESE-MAKING.

A question often asked is, "Which pays better, butter or cheese-making?" The answer must depend upon the condition of the markets. For instance, when butter is selling at 20 cents a pound, cheese should sell at about 8½ cents to realize the same profit. As a rule, butter-making has paid better in winter, and cheese-making in summer. This may not hold true always, because the cold storage of butter enables dealers to hold surplus and prevent glutting the market. It has been found to work very well to have a cheese factory equipped for butter-making, and in the fall or early winter, as soon as the market justified, to switch to butter-making. This has encouraged winter dairying and proved very satisfactory. No one should ever try to make butter and cheese at the same time in a cheese factory, because this system usually means skim-milk cheese, and skim-milk cheese should be manufactured only for ammunition.

BASIS OF PAYING FOR MILK AT CHEESE FACTORIES.

Time permits the discussion of only one other point bearing on the relation of milk to cheese-making, and that is "How shall milk be paid for at cheese factories?"

Until a few years ago the universal custom prevailed of paying for milk at cheese factories by weight alone. This method was based upon the assumption that all kinds of normal milk have the same value for cheese-making. The data already presented in this paper show that this assumption is false, and we do not need to consider it further.

We know that milk varies greatly in its composition. In paying for milk for cheese-making, absolute fairness can be realized in every individual case only by a careful, direct determination of both fat and casein, and also a just estimate of the commercial value of the cheese, based on its composition. But this is impracticable. However, fat alone in milk can be used as a fair basis in determining the value of milk for cheese-making, for the reason already pointed out, that the amount of cheese made from different milk is not exactly, but nearly, in proportion to the amount of fat present in milk, especially in such milks as we find made into cheese. Attention has also been called to the fact that cheese made from milk rich in fat possesses a higher value in its constituents, pound for pound, than does cheese made from milk poorer in fat.

Let us now make a brief comparison, showing how the two methods of paying for milk operate:

For the sake of simplicity, we will compare the milks of two men, when there is a difference of 1 per cent. of milk-fat, for example, 3 and 4 per cent. We will assume that the cheese nets 10 cents a pound. We will make our comparison on the basis of 100 lbs. of milk, allowing that the cheese yield from 100 lbs. of milk containing 3 per cent. of fat is 8.55 lbs., and from milk containing 4 per cent. of fat 10.40 lbs.

When milk is paid for by weight alone, each patron receives the same amount of money for 100 lbs. of milk, without any reference to the composition of the milk or the amount of cheese it will make. The amount of cheese made from 100 lbs. of each kind of milk specified above is the sum of 8.55 lbs. and 10.40 lbs., or a total of 18.95 lbs., which, at 10 cents a pound, brings 189.5 cents. This is divided equally between the two patrons, because each furnishes the same amount of milk. Hence, each receives 94½ cents for the cheese made from his milk. When payment is made by this method, A receives the same amount of money for 8.55 lbs. of cheese that B receives for 10.40 lbs. A receives over 11 cents a pound for the cheese made from his milk, while B receives only 9.1 cents a pound for the cheese made from his milk. A receives 31.6 cents for each pound of his milk-fat, while B receives only 23.7 for each pound of his.

When the milk is paid for according to the fat content, the receipts from the cheese are divided according to the amount of fat furnished. A

and B respectively furnish 3 and 4 lbs. of milk-fat. The receipts from cheese are 189.5 cents, of which A receives three-sevenths or 81.2 cents, and B receives four-sevenths or 108.3. Tabulating for comparison, we have the following:

PATRONS.	Per Cent. Fat in Milk.	Lbs. Cheese Made from 100 Pounds of Milk.	Money Received by Weight-of- milk Method.	Money Received by Milk Fat Method.
A	3.	8.55	Cents. 94.75	Cents. 81.2
B	4.	10.40	94.75	108.3

A comparison of the two methods of payment shows that A receives for 100 lbs. of milk 13.55 cents which belongs entirely to B. One method makes no difference in the value of the milk furnished, while there actually exists a difference of 25 cents for 100 lbs. of milk in favor of B. Estimated for a cheese factory season, the difference between the dividends of A and B should not be less than \$7.50 for each cow. That gross injustice must inevitably be done when milk is paid for by the weight-of-milk method, becomes too obvious to require further discussion.

Where the milk-fat basis of paying for milk has been honestly and efficiently tried it has become permanent. There can be no question now in regard to the entire practicability of the plan. It has long ago gone beyond the realm of theory.

How far-reaching the adoption of this system is in its effects I will point out briefly by giving a general summary of why the weight-of-milk system should be discarded in favor of the milk-fat system.

REASONS FOR DISCARDING THE WEIGHT-OF-MILK METHOD.

First. Because it is based upon the false assumption that all kinds of milk have the same cheese-producing value. It fails to recognize the fundamental fact that milks differ in regard to the amount of cheese they can produce.

Second. Because the method, being founded upon a false basis, is unjust, and is, therefore, not business-like. By this system, money which belongs solely to the producer of the better milk is taken from his pocket and transferred to that of his neighbor, who produces poorer milk.

Third. Because the old system discourages the production of better milk and is a positive barrier to improvement. When milk is paid for by weight alone, then more money can be gained by increasing the amount of milk produced, without regard to its composition. It is a well-known fact that under this system the composition of milk has deteriorated in the last generation, and so long as a premium was offered for increasing the

amount of milk produced, there was no inducement to pay any attention to the composition of the milk, if only it met the legal requirements.

Fourth. Because the old system encourages the addition of water, removal of cream, and all similar forms of dishonesty. When quantity and not quality is paid for, some will be found who will try dishonestly to take advantage of the system; and this can hardly be surprising when the system itself is founded upon an untruth and is itself dishonest.

REASONS FOR USING THE MILK-FAT BASIS IN PAYING FOR MILK AT CHEESE FACTORIES.

First. Because the amount of fat in milk offers the most accurate, practicable and just basis we have for determining the cheese-producing value of milk.

Second. Because this method recognizes the fundamental truth that different milks possess different values for cheese-making.

Third. Because this method, being based upon the truth, is just to all, and is, therefore, in the highest sense business-like. It guarantees pay for what is in the milk that makes cheese.

Fourth. Because the adoption of this method will result in an improvement in the character of the milk production. Why? Because it offers an inducement to each dairyman to improve the composition of his milk. It puts more into the pocket of the man who produces the better milk. This improvement will be realized as a result of more careful selection of dairy animals, more attention to breeding, more intelligent and economical feeding, more humane treatment of dairy animals, and better care of milk.

Fifth. Because all temptation to adulterate milk by watering or skimming is removed.

Sixth. Because the adoption of this system lies at the very foundation of the future improvement of the dairy industry. Nothing will so quickly open the eyes of dairymen and show them the need of improvement in milk production as the application of this system to their herds and individual animals.

Seventh. Because improvement in the character of dairy animals and in the consequent yield and composition of milk means economy of production and increased profit.

Convention adjourns at 12 o'clock noon Thursday, December 15, 1898, until 1 o'clock p. m. of the same day.

Mooresville, Ind., Dec. 15, 1898, 1 p. m.

President Woods: We can not buy in Indiana, at least up in our county, any cheese except that which comes from Illinois or Wisconsin. It seems to me there are enough men in Indiana to make enough cheese for everybody. We ought to learn to make cheese in Indiana as good as is made anywhere.

Mr. Drischel: I have been in the business six years. After the sixth year we adopted the Babcock test. There was a great deal of opposition on the part of our patrons which had to be overcome. We had a patron last month whose milk tested three and seven-tenths per cent., which, at the rate of twenty cents per pound for butter-fat, would make seventy-four cents. Another five and six-tenths pounds of butter-fat to one hundred pounds of milk, at twenty cents per pound, would make one dollar and twelve cents per hundred for milk. The man who takes pride in his herd and breeding will get the best results. The farmers of Henry and Wayne counties are not now buying cows on the shape of their udders, but strictly upon the verdict of the Babcock test.

President Woods: Don't you consider the quantity as well as quality?

Mr. Drischel: To make a good cheese, as Mr. Van Slyke says, the quality of the milk is the first and best principle in cheese-making, just the same as in butter-making.

Dr. Van Slyke: There is no use milking a cow whose milk tests seven per cent. fat and only gives ten pounds of milk a day. You want good rich milk and plenty of it.

President Woods: The cow that yields thirty-five or forty pounds of milk testing five per cent. is a pretty good cow.

Dr. Van Slyke: That would be a pretty uncommon cow down our way.

Mr. Drischel: I am placing the cow on the same basis as your standard horse. Your standard cow gives four pounds of butter-fat to the one hundred pounds of milk. When she goes above that she is entitled to a better price.

President Woods: Is that your average?

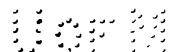
Mr. Drischel: That is the average of forty-seven patrons in our factory for the month of October.

Mr. Knox: You have been talking about quality. Have you any idea about how many pounds of milk per cow you get?

Mr. Drischel: No, sir; that would be a pretty hard question for me to answer. It is a question that the farmers of the State ought to look into. There are not over three or four full cream cheese factories in the State. That is an industry the farmers ought to look into and develop. I can say candidly that the last two years I have not left the office or the factory to sell our cheese. The trade will take it under two weeks or less. I have gone into competition at New York, Wisconsin and Illinois State Fairs, and got two or three first premiums. Our climatic conditions are just as favorable for good production of cheese as those of New York and Wisconsin.

President Woods: What do you get for cheese with reference to Illinois and Chicago prices?

Mr. Drischel: We can sell our cheese for from one-half to one cent



more per pound than the other cheese made in the United States, according to Major Alvord's statement this morning. That is home consumption, local trade.

THE PRODUCTION OF PURE MILK.

BY PROF. W. J. FRASER,

Illinois Agricultural Experiment Station, Champaign.

There is consumed daily in the city of Chicago 1,224,000 pounds of milk, each 100 pounds of which, according to the average amount of filth found in milk, contains 35 grains, which is mostly cow dung. Thus the people of Chicago alone consume daily 61 pounds of filth in their milk supply, or 11 tons per year, enough to fertilize a small farm. With these facts before us, we certainly have a subject worthy of attention.

In reply to the question sent out by the Division of Dairying of the United States Department of Agriculture, "What part of dairying is in greatest need of improvement?" most of the answers referred to the care of milk from the time it leaves the cow until it reaches the creamery, cheese factory or milk train.

After spending some time investigating the needs of dairying, including city milk supply, I became fairly convinced that the production of clean milk is the most important economical question as regards dairying to-day, as well as important to the health of the consumer.

Milk, as ordinarily produced, sells in Chicago for 6 cents per quart, while a large amount which is secured by cleanly methods, yet possessing no higher nutritive value, sells by the side of it for 8 to 12 cents per quart. This is surely a significant fact.

The value of milk when it reaches the creamery, or cheese factory, depends very largely upon the care it has received since leaving the cow, and if intended for direct consumption its value depends almost entirely upon this fact.

If dirty and tainted milk is received at a creamery or cheese factory it makes an inferior product that will not bring the highest price, thus entailing a great loss. Milk should be paid for, not only in respect to its butter content, but also according to purity, or freedom from filth, and badly contaminated and tainted milk rejected altogether.

Successful dairying is closely associated with science, especially bacteriology. This teaches us that most of the changes that take place in milk are caused by the action of extremely minute organisms, so small as to require several hundred of them placed side by side to equal the thickness of ordinary writing paper. They are found in dirt of nearly every description and are floating on the dust in the air. So far as milk

production is concerned dirt and bacteria are practically synonymous. Since bacteria are nearly everywhere present it is impossible to keep them out of the milk during the milking process. They are all objectionable in milk intended for direct consumption. Milk in the udder of a healthy cow is both pure and sterile and would remain sweet indefinitely if these organisms could be excluded; but since this is impossible the only thing to be done is to reduce their number to a minimum by cleanly methods, and by cold to prevent their increase. Milk is an excellent medium for the growth of bacteria. If special care has not been exercised in milking, many bacteria will have gained access to the milk and unless properly cooled will cause its rapid deterioration. The most noticeable of these organisms in milk are those that change the milk sugar into lactic acid, thus "souring" the milk. Milk spoils rapidly when warm because the rate of increase of the organisms present depends upon the temperature, most species developing more rapidly at the temperature at which milk is drawn; but by cooling their development is arrested. It has been shown that at 93 degrees F., some germs increase two-hundred fold in four hours; at 55 degrees F., they increase only eight fold in the same length of time, and their activity is almost entirely stopped by still lower temperature. Thus every minute during which milk is left at a warm temperature greatly shortens its keeping quality. Many other species of bacteria are found in milk, causing such changes as blue milk, ropy milk, bitter milk, etc.

Investigation shows that disease germs, such as those of tuberculosis and typhoid fever thrive in milk, and may be carried by that medium from place to place. Milk sometimes contains the germs of tuberculosis, coming from the cow herself when she is affected with this disease. Since this is one of the most common diseases in man, and since young children are more susceptible to it than are adults it is very important that the milky supply should be free from these germs. This disease may be detected by having the cows tested with the tuberculin test. Persons having germ diseases of any kind should not be allowed to care for the cows, or have anything to do about the dairy.

- The aim of the good milk producer is to protect the milk as much as possible from contamination. Not all contamination is sediment, and milk may be far from pure, even though there is no foreign matter visible to the naked eye. The number of bacteria in milk that has been carelessly produced and cared for is something enormous, there often being many millions in a single drop. Experiments have shown that the contamination of milk as usually produced may be reduced over 100 per cent. by extreme cleanliness. Many people think all bacteria are our enemies, associating them only with disease. Yet the fact is the great majority are harmless and many are our friends; indeed we could not live without them. They play a very important part in agriculture and are absolutely essential in the manufacture of fine flavored butter. Bacteria like many

other things are all right in their proper place, but this place is not in the milk pail. Therefore let us produce pure milk as free from contamination as possible, allowing the butter-maker to add his friends at the proper time, and in the amount he desires, without troubling him with the enemies.

Milk to be clean and pure must be taken from healthy cows kept under sanitary conditions. Clean milk will not only remain sweet longer, but as everyone knows is a more wholesome food. If it were more fully realized that milk is a food and not simply a commercial commodity it would seem that dairymen would not allow so much filth to get into it.

There are four principal ways that milk becomes contaminated and is subjected to them all before it leaves the stable.

First, the Cow.—This is the greatest source of contamination. When cows are kept in a filthy stable, as is too frequently the case, they are often covered with dust at milking time, and their sides, flanks, bellies and udders plastered with manure. Cows can not be milked in this condition without seriously contaminating the product. There is a constant sprinkling of fine particles of dirt and dust into the milk, the greater part of which is so fine that it is never seen. Sometimes there is so much of this filth that it is plainly visible on top of the foam after the milking is completed. Often the filthy habit of milking with wet hands is practiced, and the dirty milk is constantly dropping into the pail.

These are such common occurrences in milk production that they do not shock us. Who would think of eating any other article of food covered with a sprinkling of cow dung; and yet this is the way most milk is produced. If any new article of food was introduced produced as milk is, no one would think of touching it.

The cows should be kept clean at all times, and that is not difficult to do, if the mangers and ties are properly arranged, the stalls of the right length, and a fair amount of bedding used. All loose dirt should be brushed from the cows, and the udders washed and wiped before milking, whether they seem dirty or not.

The dairy department at the University of Illinois has been investigating the source of milk contamination, and how it may be avoided in actual practice. Several hundred plates have been exposed in the University and other dairy barns, and a few of the results are given below, each of which is an average of ten exposures. These plates are glass dishes $3\frac{1}{2}$ inches in diameter, and having a glass cover fitting closely over the sides. The empty dishes are sterilized by baking in a hot oven for twenty minutes; then sterilized beef broth containing a little gelatin is poured over the bottom, and when this cools it solidifies. These closed sterilized dishes, having twelve square inches of surface, are then taken to the dairy barn and exposed by removing the cover one-half minute. The bacteria floating on the dust in the air settles into the dishes. The covers are again replaced, and the dishes held at a warm temperature for two or three

days. Wherever a bacteria has fallen it will commence to multiply, until a colony forms which can be seen with the naked eye.

<i>Places Exposed.</i>	<i>Number Bacteria Caught.</i>
Under apparently clean unwashed udder.....	2,023
Under same udder after washing	90

It will be seen from this that the contamination the milk receives even from an apparently clean unwashed udder is very great, and is more than twenty-two times more than from a washed udder.

Second, the Stable.—Often the sides of the stable and stalls are plastered with dung, and not cleaned for years at a time. Frequently the old bedding in the stalls and refuse in the mangers are not thoroughly removed from one year's end to another, leaving a quantity of dust to be frequently stirred up. Bedding and dry fodder should not be moved just previous to milking, as it makes a dust which settles into the milk, carrying with it many bacteria. The air outside is usually comparatively free from germs, and the better ventilation the barn has the fewer germs will the stable air contain. If the cows are in the stable the greater part of the time, the stables should be cleaned at least twice a day. The ceiling should be tight, and no cobwebs allowed to collect. The floors and mangers should be cleaned frequently, and the walls and stalls scrubbed and whitewashed as often as they become dirty.

Number of bacteria caught on twelve square inches during one-half minute:

<i>Places Exposed.</i>	<i>Number Bacteria Caught.</i>
Well kept dairy barn, open.....	40
Well kept dairy barn, closed.....	68
Badly kept dairy barn, open.....	76
Badly kept dairy barn, closed.....	164
Near door, wind entering	22
Near door, opposite side of barn.....	127
Empty barnyard	2
Empty pasture	$\frac{1}{8}$
Dairy cool room	$\frac{1}{16}$

From the above we see that the air in a well kept barn contains fewer germs than that in one badly kept, also that when the barn is open there are fewer germs in the air than when closed. Since the air outside is nearly germ free they will be blown out as is shown by there being nearly six times as many bacteria caught near where the air was leaving the barn as where entering. In the pasture there were very few, only one was caught in three exposures and in the dairy cool room only one in every six exposures.

<i>Places Exposed.</i>	<i>Number Bacteria Caught.</i>
Barn empty, closed three hours.....	2 $\frac{1}{8}$
Thirty minutes later cows brought in and fed fodder.....	156
One hour later, cows eating in meantime.....	83

From these results we see that when the barn has been closed the dust and bacteria settle out of the air there being only two caught in every three exposures, while after the cows were brought in and fed dry corn fodder many bacteria were found in the air.

<i>Places Exposed.</i>	<i>Number Bacteria Caught.</i>
Dust from cut corn fodder	263
Dust from corn meal	5
Dust from brushing cows	869
Latter place after five minutes.....	125

In the first three cases there was apparently the same amount of dust in the air. It will be noticed that dust from the cows' body is very heavily laden with bacteria, while that from corn meal is nearly sterile.

Third, the Milker.—Many times the milker goes to his task clad in the same suit in which he curried the horses only a few moments before and his hands no cleaner than his dirt laden clothing. Both soiled hands and dirty clothing are loaded with germs that injure milk. Before commencing to milk, the milker should cleanse his hands and put on a clean suit and cap which are used for no other purpose and they may be easily washed. He should always milk with dry hands and never allow his hands to come in contact with the milk.

Fourth, the Dairy Utensils.—These are often very improperly washed in milky water and with a cloth simply swarming with bacteria, milk remaining in the seams and corners, and the whole surface being covered with a coating of bacteria. If utensils in such a condition are allowed to stand in a warm, damp place bacteria will develop in them very rapidly, so that by the time of the next milking a good crop has developed ready to take possession of the new milk.

The utensils should first be rinsed in cold water, then washed in hot, using some cleansing substance, as soap and sal soda, again rinsed and sterilized, either by means of live steam or boiling water and placed in the sun where dust can not blow on them.

Fresh milk is easily removed, but if allowed to become dry or sour it is difficult to get off.

The only method of securing pure milk is by preventing dirt and bacteria from entering it during milking time, for after it is once contaminated there is no remedy. Never use preservatives of any kind, cleanliness and cold are all that should be used to keep milk sweet.

True it is we have a few model dairies and I am very glad to say their number is on the increase, but the question of how to obtain pure milk will doubtless continue to trouble both the consumer and wide awake butter and cheese-maker until there is a revolution in the methods of the average dairyman.

President Woods: In washing off the cow's udder, do you wash all of them off first, then milk, or do you wash each one off just before the milking?

Prof. Fraser: The cow should be washed just before milking. The man goes along and washes the udder, and then he wipes his hands and the udder before he commences to milk.

Mr. Raab: What is the result where you wipe off or brush off the udder dry?

Prof. Fraser: The cow under which this plate was exposed (referring to plates described above—Ed.) had a very clean udder, and she was brushed off with the dry hand, but no plates were exposed under cows that had very dirty udders. This cow had a very clean udder, and it was brushed off dry—the one where 2,023 germs were shown in the plate.

Mr. Raab: It was not brushed off with a brush?

Prof. Fraser: No, simply with a dry rag.

Mr. Raab: I have tried washing them and cleaning them off dry, and I think I can get them cleaner by thoroughly wiping them off dry, or brushing them off with a brush, than I can by washing them.

Prof. Fraser: There is one difficulty in having it dry, there seems to be more dandruff and less dirt coming from the cow.

Mr. Raab: When the sun shines you can see the stuff coming down with the naked eye.

President Woods: I differ with you in regard to milking cows dry. We are doubtless not as clean as we might be. We try to keep the cows bedded good, and ordinarily do keep them clean.

Mr. Johnson: I would like to know whether the butter exhibitors here wash the udders or brush them dry.

Mr. Lamont: I do not wash the udder. I rub it off good and dry with the dry hand, and I keep the cows bedded about knee deep in straw.

Prof. Plumb: I would like to ask Prof. Fraser how many duplicate tests he made in most of these cases?

Prof. Fraser: In none of them less than nine, and there have been nearly a thousand plates exposed.

Prof. Plumb: Do you have a man go along and wipe off with a damp cloth the udders of a line of cows, and then later expose plates underneath the udders?

Prof. Fraser: This was from an udder just previous to washing. That is, the cow was milked half dry, and then the same cow was washed thoroughly, and the milking continued. Of course that was just an experiment to have the same udder and see the difference when washed and unwashed.

Prof. Plumb: Did you, in connection with this same milk, see if there was any difference in the keeping quality of the milk?

Prof. Fraser: No, sir; but you know that milk with a large number of bacteria in it does not keep as well as with a small number.

President Woods: Was there any difference in the first and last milking in the number of bacteria?

Mr. Fraser: Yes, the first milking has a great many more than the last. When a milking is completed of course there is a little milk left on the end of the teat, and the milk decays and bacteria develop there, and they work up into the teat somewhat, and then when you commence milking the first two teats full are heavily laden with bacteria, but after milking awhile the milk is very nearly sterile as it comes from the udder.

Prof. Plumb: How many men here who milk dairy cows wipe off the udders with a damp cloth or wet sponge, or anything of that kind, just before milking the cows? There are four. How many brush them off with a brush before milking? There are two. How many milk cows who don't give them any special attention of this sort? There is but one. How many use the dry cloth in brushing off the cows? There are fourteen. How many are there here that milk cows for commercial use? There are twenty-three.

President Woods: Why isn't a whisp of good clean oats straw just as good as a brush?

Prof. Fraser: It only stirs up the dust.

Prof. Plumb: How are you going to tell whether it is clean or not?

President Woods: Well, it is just out of the stack, we will say.

Prof. Plumb: I would like to ask how many in this room use milk coolers? There are four.

Mr. Raab: I cool my milk in water.

Mr. Johnson: We used a milk cooler for awhile, and we could not see any advantage. The one we used exposed a large surface of milk over night, and we abandoned that, and we cool our milk by having cans set in the water.

President Woods: My brother had some experience with a milk cooler. He complained of the strong odor of the milk; not sour, but had a strong odor.

Mr. Thomas: I do not cool any milk, but I cool my cream with a sprinkler with all the holes stopped up except one row.

Prof. Fraser: The place where you cool it has much to do with it. If you cool it in the barn or stable where there are odors, they will affect the milk; and this is also true of bacteria. They develop much more rapidly in milk about the temperature at which it is drawn.

Mr. Knox: If milk is cooled to fifty degrees quickly, and then sealed in a bottle, will these bacteria multiply?

Prof. Fraser: The sealing would not make any special difference with it, but if it is cooled to fifty degrees they will not multiply anything like

as fast as they will if the temperature is higher. They will multiply to a certain extent, but it will be very slowly.

Mr. Drischel: When we use what is called the Marshall Rennet Test, one of the biggest improvements in the cheese dairy business that could be brought to the attention of the farmers of this State. We frequently get milk into the factory at eighty-four degrees, and this prevents the production of good butter and good cheese.

Major Alvord: I heard two of the largest milk dealers in Philadelphia state, the other day, that they would accept no milk not delivered to them at forty-five or less degrees. That is the rule of the large dealers of the city of Philadelphia, forty to forty-five degrees.

Mr Drischel: When we use what is called the Marshall Rennet Test, and the milk runs down to three and a half degrees, we reject it and throw it back into the hands of our patrons. If the farmer will aerate his milk it will save much of this trouble.

WHY SHOULD WE HAVE A PURE FOOD LAW?

BY J. N. HURTY, M. D., INDIANAPOLIS.

Secretary State Board of Health.

The question is propounded, Why should we have a pure food law? There is but one reason for a pure food law, and that is to protect the people from impure or adulterated foods. It would be obviously wrong for the State to pass a law to give aid to any special business. The extent of the adulteration evil is not so great as it used to be. People are more on the alert than formerly. In Indianapolis, while formerly we found 15 per cent. of all the milk delivered there was adulterated with water, now there is about 5 per cent., and that 5 per cent. does not come from the dairy wagons as a rule, but from the groceries. It is when the health officer descends upon the grocery in an unexpected moment that he finds this watered milk. With your permission, we will take 5 per cent. as a basis for application over the whole State. I think we are in the range of truth in saying that, on an average, about 10 per cent. of the following articles are adulterated to the extent of 10 per cent.: Butter, coffee, mustard (all mustard is adulterated), confectionery, jams, milk, bread, flour, tea, spices, wine, beer, spirits and drugs. If that be true, then I think it is high time we should regulate the matter by law. We have some anti-adulteration laws in this State, but no provision for their enforcement. The greatest adulteration of any articles in Indiana appears in spirits. About 23 per cent. is bad: coffee about 16 per cent., then butter, milk and spices 14 to 15 per cent., lard and wine 7 per cent., and bread and confections 4 per cent., bread only about 1½ per cent. In order to under-

stand their national importance, let us take the number of inhabitants at 60,000,000, and apply it to milk alone. Let us allow an average of one-third of a pint of milk daily for each person. Some of us do not get any. If we use, then, one-third of a pint of milk daily per person, this will make 20,000,000 pints. If 5 per cent. is adulterated with water, we have 1,000,000 extra pints of water sold daily as milk. If the average price of milk is three cents per quart, then \$150,000 is spent daily for water in the United States. In one year this amounts to \$5,470,000 worth of water. The milk dealers of the country ought to be getting rich. Now, discount this one-half if you will, for fear we are too high, and then we have \$2,700,000 spent. These are the figures, and they are simply startling when we see the immense sum.

Let us apply the same method of figuring to Indiana. We have 2,600,000 inhabitants. If we have 2,600,000 inhabitants, there would be 866,000 pints of milk consumed daily, and 5 per cent. of it is adulterated, which makes 21,000 quarts of water, which, at three cents per quart, makes \$630. As these figures are to apply to the cities and not to the country, let us cut it in two. That would make \$365 a day spent in Indiana for water. Cut it in two, and you will have a large enough sum to show that there is a great loss of money.

If, then, we have made the point that money is lost and probably some other harm done, it is high time that we should have a comprehensive food law.

Now about adulteration and health. Health is the basis of all happiness and morals. Life is not worth living unless you are healthy. Then, if we can find any connection between adulteration and ill health, the man who is doing the adulterating is certainly striking at the very bottom of our happiness. If I substitute a harmless substance for nutritious material, we have only subtracted from its nutritious power, as water in milk, for instance assuming the water and the milk to be pure—not typhoid water, but simply pure water. We have subtracted from the nourishing power of the milk, but we have not at the same time introduced into the bodies of the people something that injures their health. It is only a certain amount of nutrition that is lost. There is a distinction between adulteration and substitution. Adulteration robs foods of their nourishment and drugs of their power. Under the plea of preserving fermentable foods, strong chemicals are used, sometimes with danger to life. The evil effects fall most heavily on the poor. Hence, it is all the more reason why we should be interested. A great many of the canned goods in the groceries are preserved with chemicals such as boric, salicylic acid and formaldehyde. Digestion itself is in a sense a process of fermentation. When we eat catsup that has chemicals added to preserve it, we disturb digestion, interfere with nutrition, and at the same time derange the general economy.

I believe the point is made that we ought to have a law, and a good one, but I will make this further argument: One-fifteenth of the popula-

tion of Indiana comprises 175,000 infants that are either being fed upon their mothers' or cows' milk. If we say that 44,000 of them, or 25 per cent., are fed on cows' milk, and make the calculation on the basis of five per cent. of adulteration, one-twentieth of the infants are fed on water alone, or 44,000 Indiana infants have their food adulterated one-twentieth, or 5 per cent. Thus starved at the threshold of life, is it surprising that the children of the poor develop into feeble and stunted men and women, and that such a great per cent. of them are in poorhouses, or in insane asylums, or under the care of Township Trustees, and in prisons? Thus you can readily see how starvation depresses the morals. Morals are depressed by bad food. At Indianapolis I can show you—not many, but some—places where the sole nutrition of the children is fourth or fifth grade molasses and sodden bread, and nearly all of those children, of course, in the end find their way into the poorhouses and insane asylums and prisons; and we therefore foster the conditions that fill those institutions, and then afterwards tax ourselves to support them. The watering of milk affects the health in another way, and the diseases that come from unhealthy cows is not all the danger, but there are added to that the dangers of bad water, which are increased by the fact that milk is an admirable medium for the growth of minute organisms which are concerned in the propagation of so many diseases. Besides the forms of adulteration in which the nourishing power of foods is reduced by the abstraction of valuable constituents, or by the dilution of materials harmless of themselves. Injurious substances are still found in some of the commonest articles of diet. Alum in bread is now a thing of the past, but in baking powders it is still found, generally in all cheap ones. It is a question whether or not alum in baking powder is injurious. I can not enter upon that argument. Tinned goods often contain poisonous material, generally only in minute proportion, but not always so. The use of metallic pigments in sweets is now almost entirely abandoned, and in their place we find aniline colors, some of which are injurious to health, and some not. But we can say, on general principles, that artificial colors, if used at all, must not be used, as the doctors say, *ad libitum*, but under restrictions. Let candy be colored, but let it be colored by entirely harmless substances, regulated by the State, because, if left to himself, the maker of confectionery is liable to use harmful substances.

Our butter in the cities is very badly adulterated. Watered butter is frequently found. I will tell you how to make it. Take a quart of whole milk, warm to 105 degrees Fahrenheit, the temperature of the body; put into it ten or twenty grains of good pepsin; then melt an equal weight, say two pounds, of ordinary butter, and put it into that milk, and churn, and it will emulsify and make a solid mass. In that way a pound of milk is emulsified with a pound of butter, and it is adulterated. The lowest grade of this pepsin butter contains 53 per cent. water, 36 per cent. fat, 1 per cent. salt and 10 per cent. curd. Butter ought not to contain more than 10

per cent. of water. Watered butter is all over the State. It has been sent to the State Board from Fort Wayne, Laporte, Evansville, Terre Haute, Bluffton and other places. The people should be protected from the fraud. Watered butter in some instances sells at 15 cents a pound. Now, as I have said, the greatest evil to dairy products does not lie in the adulteration of milk with water, or butter with water, but Professor Fraser has illustrated where the great evil lies. It is in the dirt that is in it. You have, most of you, read of the experiments of Nathan Strauss in New York. In a certain district of that city he supplied the people with sterilized milk. The experiment cost him about \$40,000. He is now President of the Board of Health of Greater New York. He was a philanthropist, and found that simply sterilizing the milk, killing the microbes in it, reduced the death rate very materially and the sick rate enormously in that district. Hence it was proven by a great practical experiment that the men furnishing the milk were killing in New York a number of infants annually. There were also dairies around there (slop dairies, wastillery dairies) that were dirty and filthy. I believe the greatest evil in dairy products is the dirt that gets into the milk at the time of milking.

If we are to have a pure-food law, what shall it be? I stated in the beginning, and I must adhere to it, that any law that is passed must not be for the benefit of the dairymen, but for the benefit of the whole people. We have a medical law, but it is not to protect the doctors. It is to protect innocent people against quacks and against wrong service, because the people can not protect themselves.

We can not have bureaus in this State upon every subject. We must not have a multitude of bureaus to look after this, that and other interests, but they must be as few as we can possibly get along with. The first principle which we must follow in legislation is to approach the matter in an absolutely unselfish, righteous frame of mind. We must have a law with the least possible expense connected with its enforcement. If bureaus are multiplied, the expense is very great. The Department of Agriculture has thirteen divisions under one head. I propose, if any legislation is advanced in Indiana on health matters, upon food matters, etc., that it all be put under one head, and let that head be, if you will, a Board of Health Commissioners. Let such board be composed of an agriculturist, a veterinarian, an attorney, a business man, an engineer and two doctors.

The State Board of Health proposes some amendments to the present health law. Permit me to announce what it proposes to do in the way of food legislation:

"No person shall, within this State, manufacture for sale, offer for sale or sell any drug or article of food which is adulterated within the meaning of this act. The term 'drug,' as used in this act, shall include all medicines for internal or external use, antiseptics, disinfectants and cosmetics. The term 'food,' as used herein, shall include confectionery, condiments, and all articles used for food or drink by man.

"An article shall be deemed to be adulterated within the meaning of this act—

"(a) In the case of drugs: (1) When sold under or by a name recognized by the United States Pharmacopoeia, but differs from the standard of strength, quality or purity laid down therein, unless the order calls for an article inferior to said standard, or unless such difference is made known or so appears to the purchaser at the time of said sale; (2) if, when sold under or by a name not recognized in the United States Pharmacopoeia, but which is found in some other pharmacopoeia or other standard work on materia medica, it differs materially from the standard of strength, quality or purity laid down in such work; (3) if its strength or purity falls below the professed standard under which it is sold.

"(b) In the case of food: (1) If any substance or substances have been mixed with it so as to reduce or lower or injuriously affect its quality or strength; (2) if any inferior or cheaper substance or substances have been substituted, wholly or in part, for it; (3) if any valuable constituent has been, wholly or in part, abstracted from it; (4) if it is an imitation of, or sold under the name of, another article; (5) if it consists, wholly or in part, of a diseased, decomposed, putrid or rotten animal or vegetable substance, whether manufactured or not, or in the case of milk, or if it is the produce of a diseased animal; (6) if it is colored, coated, polished or powdered, whereby damage is concealed, or if it is made to appear better or of greater value than it really is; (7) if it contains any added poisonous ingredient, or any ingredient which may render it injurious to the health of the person consuming it. The provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles of food or drink, provided that the same are not injurious to health, and are distinctly labeled as mixtures or compounds; and no prosecutions shall at any time be maintained under such act concerning any drug the standard of strength and purity whereof has been raised since the issue of the last edition of the United States Pharmacopoeia, unless and until such change of standard has been published throughout the State. The State Board of Health shall take cognizance of the interests of the public health relating to the sale of drugs and food, and the adulteration of the same, and shall make all necessary investigations and inquiries in reference thereto, and for these purposes the State, county, city, town and State Health Officers shall be food and drug inspectors, subject to the State Board of Health Commissioners. Within ninety days after the passage of this act the said board shall adopt such measures as may be necessary to facilitate the enforcement herein, and shall prepare rules and regulations with regard to the proper methods of collecting and examining drugs and articles of food. Every person offering or exposing for sale or delivering to a purchaser any drug or article of food included in the provisions of this act shall furnish to any analyst or other officer or agent appointed hereunder, who shall apply to him for the purpose of, and shall tender to him the value

of the same, a sample sufficient for the purpose of the analysis of any such drug or article of food which is in his possession. Whoever hinders, obstructs, or in any way interferes with, any inspector, analyst or other officer appointed hereunder in the performance of his duty, and whoever violates any of the provisions of this act, shall, upon conviction, be fined in any sum not exceeding one hundred dollars. Whoever fraudulently adulterates for the purpose of sale bread or any other substance intended for food with any substance injurious to health, or knowingly barter, gives away, or has in his possession with intent to sell, any substance intended for food which has been adulterated with any substance injurious to health, shall be fined in any sum not exceeding one hundred dollars, and the articles so adulterated shall be forfeited and destroyed, under the direction of the court. Whoever adulterates for the purpose of sale any liquor used or intended for drink with Indian cockle, vitriol, grains of paradise, opium, alum, capsicum, copperas, laurel water, logwood, Brazil wood, cochineal, sugar of lead, or any other substance which is poisonous or injurious to health, and whoever knowingly sells any such liquor so adulterated shall be punished by imprisonment in the State Prison not exceeding three years, and the articles so adulterated shall be forfeited."

Note the brevity of this law. Is it sufficient? Will it do what you want it to do? If you want a law to protect yourselves, I am decidedly against it, because it is wrong. If you want a law to protect the people, I think it is here. It simply says no article of food which is not all right—and then tells what is right—shall be sold, and then the State Board of Health, with its officers in every county seat and town, shall enforce. The adulteration of food refers to health, and why not put it under this bureau, and not establish another? The State Board of Health is not doing anything in secret, not trying to sneak any law through, as it has been advised to do by politicians. Let us discuss it openly. We have adulteration, and it should be stopped because it is wrong. It should be regulated, and I think this is the best way and the cheapest way to regulate it.

Prof. Plumb: At two different sessions of the Indiana Legislature there has been an attempt made to secure the passage of a bill to regulate the manufacture and sale of artificial dairy products. This is not, it seems to me, the time for us to discuss the merits or demerits of the bill that Dr. Hurty has brought to our attention. It seems to me the most important feature in the discussion which may come up here is that we shall, as an organization, decide that we will most emphatically throw our strength toward the enactment of a law which shall provide for the selling of pure food products, and that includes dairy products. Now, there are such States as Iowa and Ohio which have a commissioner called a Food and Dairy Commissioner. I have talked with numerous members of the Legislature; I have had an extended conversation with Dr. Hurty on this question; I have interviewed one of the most influential journals in Indianapolis; I have talked with one member of the Legislature, who lives

in Indianapolis on the same question, and have talked to these members on the necessity of a dairy and food law being passed by this Legislature, and I have said that I felt that I could safely say that the Indiana Dairy Association would use its influence during the coming session for the passage of a law with reference to the selling of pure foods in this State. Dr. Hurty is in a position to know something about these matters, and I being associated with the State Experiment Station, it happens to be my fortune also to know something of the situation, and every little while I receive a letter from Indianapolis addressed to the Pure Food Commissioner of Indiana, that the postmaster forwards to my office at Lafayette, and that communication almost always calls for a copy of our Pure Food Laws, and asks for information as to what authority a certain person has to sell a certain class of goods in our State, or asks for a list of cheese factories and creameries, or establishments selling dairy goods, and in every case we have to say the door is open. We have no pure food law. We have a few little laws on our statute books. You will find copies of them in our last annual report; but there is nobody to enforce those laws, and so they lie as dead letters on our statute books, and the only thing which approaches the enforcement of a dairy law in Indiana are the city laws enacted by the city councils in our State. I took part in the discussion at a meeting at Fort Wayne on this same question, and I heard the City Bacteriologist of that city make a statement concerning the character of milk sold in Fort Wayne, and I tell you it is a shame and disgrace to the State of Indiana that such a statement could be made, that such inferior milk should be sold in Fort Wayne as he there stated was sold. Now, the members of this organization have a duty. I have sent out a circular letter, as all the members of the Association are aware of, to each Representative and Senator, in which I state that this Association will ask certain favors of the next Legislature, and one of those favors will be a renewal of the financial favor that was extended to us by the last Legislature; and I felt that I was on safe ground in assuming another thing would be brought up, and that would be the matter of a pure food law; and so we must throw our strength toward the carrying out of such a law as will be approved by the Legislative Committee which has already been appointed. I take it that this committee will be advised of all legislative work carried on at the Capitol that will in anyway pertain to the dairy and food interests of this State; and it seems to me it would be very appropriate that it should use such influence as possible toward the introduction of a satisfactory bill in the committee room, and then advise each member of our organization to use their personal influence with the Representatives all over this State, and in that way bring a pressure on the men who are to represent us in the Legislature. Then we will hit the nail on the head and get something through. Two bills that have already been presented through this Association have died in the committee room, and so long as they never get beyond the committee room they will do us no

good. We are stronger than ever before, and let us put our shoulders to the wheel and see that laws are enacted during the coming session that will put us on a level, at least, if not above the level, of our sister States. As things are to-day, we have no suitable laws, while States all around us have. Let us use such influence as we can to secure suitable laws on our statute books for the protection of the people of the State, and the dairy-men as well as anybody else.

Major Alvord: It has been my duty recently to make a pretty careful study of what are known as dairy food laws of the several States, and of the dairy laws, and their effect. I have also made a study of the decisions of the courts as to the constitutionality of these laws, and their effectiveness in the way of enforcement and prosecution. I have noted the fact that, as a rule, those laws which were intended to be comparatively narrow, and apply only to dairy products, and which are supposed to indirectly benefit the dairy industry, have been inefficient in their operation and unsatisfactory to those who caused them to be enacted, whereas, on the contrary, the general pure food laws, where they have been correctly drawn, and have been made reasonably short, and wide in their application, have been of great advantage to the communities in which they have been adopted and enforced, and have really done much more good to the dairy interests, as well as to other productive food interests, than the special laws which, in their name, apply only to dairy matters. Hence I am pleased to see that the tendency in this State is to try an efficient pure food law, rather than attempt to legislate on another basis. It is certainly, as we have been told by the principal speaker on this subject, a much safer and more satisfactory basis to stand on and to defend, to advocate a general law applying to all food products, and for the benefit of the people as a whole, than to advocate a narrow law relating only to one class of food products, and evidently for the special benefit of one class of producers. So I hope this line of action will be pursued not only in this State, but in other States. In framing a pure food law, I think it is entirely right and fair that those interested in dairy matters should watch its phraseology and provisions closely, in order to see that, among other interests that are to be benefited by it, are those of consumers first, and of producers second, of pure dairy products. There are new forms of impurities and adulterations in dairy products coming before us all the time. I was surprised to be told by the doctor here a few minutes ago that this old and somewhat familiar, and at the same time comparatively unusual, butter fraud in the way of pepsin butter, or curd butter, should be showing itself so widely in this State. I can not understand how anybody who ever bought a particle of good butter could be deceived by this pepsin or curd butter, as it is ordinarily offered and sold on the market. As to this proposed law which has been read, I followed it as closely as possible, and I have some doubt as to whether the courts would sustain that law as applied to suppressing the pepsin butter fraud; and I am rather inclined

to think that the manufacture and sale of this pepsin butter could be continued under that law without much danger of prosecution. But however that may be, there is very little of it in most parts of the country. But we have now another butter fraud of very wide extent, more dangerous to the consumer, and more threatening to the dairy industry and manufacturers of pure butter, than the pepsin butter, and that is butter put on the market under the head generally of creamery butter, but which is actually process butter, or bad butter made over into passably good butter. An immense amount of capital has been invested in this industry within the last ten years, and the profits are very large; and in our large markets there are increasing products of this kind of butter put on sale, and almost always under cover of a fraudulent name, and sell it for what it is not. And I am very certain that this proposed law, as read, would not touch this new and very threatening evil of process butter. There is no provision in the law that would touch these two points. I can not stop to go into it in detail, but there is only one pure food law in the United States which will touch the subject of process butter. So I raised these two points with the hope of suggesting to a legislative committee of this Association to watch those lines in which their interests are specially concerned in the final framing and passing of the proposed pure food legislation in this State.

Dr. Hurty: Major Alvord missed one of the foremost points in this whole law. In New York the Legislature, in giving a charter to a city, says that its local legislature or council has the power of regulating so and so. These ordinances are passed and are the law right there. This is somewhat the same. Here is a blanket statute covering the whole thing, and there is the power of the State Board of Health to pass ordinances to meet this very thing. The blanket law covers this case Major Alvord mentions, because it says every fraudulent thing. It leaves to this board the power to pass ordinances or by-laws to enforce the very thing that might be left out. In Ohio they have such a statute which tries to cover every detail, and it has caused nothing but trouble. Under this blanket law there is a board of seven men, and if they make any ordinance or by-laws, it must be under the provision of the general law. These by-laws can be readily changed. The State Board has had experience in that, and these by-laws can be enforced, and they can pass by-laws, but they may not extend beyond the border of the general law.

Major Alvord: Must you not be confined to the definition of food and its adulterations?

Dr. Hurty: Yes.

Major Alvord: Process butter does not come in under your definition of food. It is made up in an artificial way.

Dr. Hurty: It is bad material.

Major Alvord: All of which you can not prove when you find it.

Dr. Hurty: The law says anything fraudulent. If you can show anything, it is fraudulent. It seems to me, then, you could touch it by an

ordinance. We pass laws or rules governing quarantine, and in three places we have enforced those laws absolutely, and yet our health law says nothing about quarantine. The Board of Health has power to define what quarantine is, and the court that quarantine is a police power.

THE ECONOMICAL FEEDING OF DAIRY CATTLE.

BY O. P. MACY, MOORESVILLE.

In the economical feeding of dairy cattle lies the secret of success in dairying. For what does it profit a man if he has a herd of cows capable, with proper care and feeding, of producing 6,000 or 7,000 pounds of milk, or 300 or more pounds of butter each per year, if, from lack of sufficient food, they come nowhere near this mark?

Or if the feedstuffs fed cost more than the product of the cow is worth in the market?

Authorities on feeding animals tell us, and prove it by experiments, that the main factor in economical feeding of all animals is using a ration containing digestible nutrients in the proper proportions necessary for the purpose to which the animal is put. It has been found that the average ration for a cow weighing 1,000 pounds and in full flow of milk should, for the best results, contain about 25 pounds of dry matter, with digestible nutrients about as follows: Carbohydrates, 12.50 pounds; protein, 2.25; fat, .75; having a nutritive ratio of about 1:5.8. The stomach of the cow is so arranged that a considerable part of the ration must be of a bulky nature. This may be supplied by corn fodder, corn stover, clover hay, silage, etc., and by adding concentrated food in the form of grain, bran, corn meal, oil meal, cottonseed meal, etc. The deficiency of protein and fat may be supplied. Select the grain bought by the price in the market as compared with other grain containing the same ingredients in which your ration is lacking.

By using the tables giving the composition of the different feeding stuffs frequently published in Hoard's Dairyman and other dairy journals, any dairyman should be able to formulate a ration for his cows from the feeds he has on hand and can purchase. After he has done this he can apply the practical test by feeding it to his cows, and adding to or taking from, and noting the result. We usually feed for a winter ration about 40 pounds corn silage, 6 or 8 pounds clover hay and 8 to 10 pounds of bran, varying the ration according to the requirements of the animal. This ration has a nutritive ratio of about 1:6, and at present prices it costs us from 10 to 12 cents a day, and which, if fed to a cow producing a pound or more of butter per day, we consider to be about as economical a ration

as we can find in this part of the State. Sometimes we use a little oil meal, if cheaper in proportion to its feeding value than bran. If we depended upon dry fodder or clover hay for roughness, would make oil meal a part of the regular ration, but with silage this is unnecessary.

Another opportunity for the dairyman to practice economical feeding, and which is diined into our ears from year's end to year's end, is to have some form of green food to supplement the pastures during the drouth, which seldom fails to put in its appearance during the latter part of summer. Possibly the best and cheapest method is the use of the summer silo; however, if this is impossible or impracticable, some soiling crop should be planted especially for this purpose. Sweet corn, oats, cow peas, clover, and later in the season common field corn, cut daily and fed to the cows, will greatly assist in keeping up the flow of milk, and the expense will be outweighed by the profit derived therefrom. In fact, on small farms or high-priced land it is a question if soiling, altogether depended upon, would not be more economical than grazing during any part of the year. No doubt but that more cows could be kept or fed from the same number of acres. Where land is cheap and labor scarce, pasturing would be more economical than soiling; but with high-priced land and cheap labor soiling would probably be most profitable. At any rate, it will pay any farm to have a soiling crop ready when the pastures fail.

As milk is about 85 per cent. water, it is very necessary that the cow should have a plentiful supply of good clean water to drink. She should not be compelled, as too many are, to drink ice water during the winter. If made to do so, she will not drink sufficient for her needs. Nothing is cheaper in Indiana than water, and there is enough for every cow to have all she requires. If one is supplied with a windmill and storage tank, a very few more dollars would buy a tank heater and fuel, and the cows would show their appreciation at the pail. Any one can at least pump fresh water for his cows daily, even if he has no windmill or tank heater. Water as it comes from the earth has a temperature of about 52 degrees Fahr. Cows can drink a sufficient quantity at this temperature, even in very cold weather, without chilling them, and thus cause a falling off in the milk flow.

Last, but not least in the economy of feeding dairy cattle, is the question of providing protection from exposure. I believe I can best illustrate this by quoting from H. B. Gurler in his *American Dairying*. He says: "In the winter of 1892 the Indiana Experiment Station made a very valuable experiment to show the effect of exposure on milch cows." He then quotes extensively from the Station Bulletin, No. 47, from which I make the following extracts: Lot No. 2 (the exposed one) ate 243.8 pounds more food than Lot No. 1, but less hay and much more grain, consuming 388 pounds more of corn meal and 368.2 pounds more of bran. The difference in the cost in the total amount of food eaten has an important bearing on the relation of expense and income. The cost of food eaten is based on

current market prices in Lafayette at the time of the experiment. The cost of labor was no greater for Lot No. 1 than for Lot No. 2, if it was as great, and is not included in the discussion of the experiment. The total cost of food consumed by Lot No. 1 was \$29.97; Lot No. 2, \$32.20.

So far as cost of food eaten is concerned, the sheltered lot makes the best showing by \$4.23. This experiment, however, was undertaken on milch cows to note the effect of the conditions of keeping on the milk yield.

Considering this experiment from the financial standpoint, including cost of food eaten, weight of milk secured, and animal weight lost or gained, we get the following results in favor of the sheltered lot:

Saving in cost of food eaten	\$4 23
Value in difference of milk secured (161.1 pounds, at 15 cents a gallon)	2 79
Value of 231 pounds flesh gain at 2½ cents a pound.....	5 77
Amount saved by sheltering the cows 48 days	12 79
Amount saved by sheltering one cow 48 days.....	4 26

For further information as to the effect of exposure on milch cows, I beg leave to refer you to Prof. C. S. Plumb, director of the station at Lafayette, who conducted the experiment.

REPORT OF COMMITTEE ON RESOLUTIONS.

Whereas, Divine Providence has permitted us to again assemble in honor of the dairy interests of the State of Indiana, be it

Resolved, That we extend a vote of thanks to the people of Mooresville and vicinity for the royal manner in which they have entertained us, furnishing not only comfortable quarters for our meeting, but opening their homes and loading their tables, have bid us welcome and made us comfortable. We also thank those ladies across the way who have furnished us meals.

Resolved, That, as members of the Indiana State Dairy Association, we are still unequivocally opposed to the sale of oleomargarine in our State, and that we recommend to our representatives, both State and national, the enactment of such laws as shall prohibit the manufacturers of oleomargarine from coloring their product in imitation of genuine butter, and also to enact laws compelling dealers in oleomargarine to sell it for what it is.

Whereas, Indiana is the only State in the Middle West, north of the Ohio River, which has no pure food laws,

Resolved, That we, the members of the Indiana State Dairy Association, use our influence, and call on all friends of pure dairy and food prod-

ucts to use their best efforts, to secure, at this session of our Legislature, such legislation as will protect the consumers of our State against the unscrupulous manufacturer and dealer, and prevent them using our State as an outlet for the adulterated products they can not sell in our neighboring States.

Resolved, That creamery managers and butter makers be encouraged and earnestly solicited to attend the National Butter Makers' Association, to be held at Sioux Falls, S. D., January 23-29, 1899.

Whereas, It is to the best interests of dairy owners and farmers, as well as the whole public, that dairies and farms should be kept free from disease; therefore, be it

Resolved, That this Association most earnestly solicits the advice and aid of the health authorities and of all physicians in the matter of disease prevention.

Resolved, further, That we advise the formation of sanitary associations in every community, to the end that the cause of disease prevention may be advanced.

Resolved, That we extend a vote of thanks to Prof. Emma Mont. McRae, Dr. VanSlyke, Major Alvord and Prof. Fraser for their excellent addresses and the enthusiasm they have brought to our meeting.

Furthermore, That we express our appreciation of Mr. Galleger's conscientious and impartial work in scoring the butter and cheese.

SAMUEL SCHLOSSER,
WM. SYKES,
J. H. HARVEY,
W. L. THOMAS,
H. E. VAN NORMAN.

Mr. Commons: I move that Cambridge City, Indiana, be selected for the next annual meeting, at a time to be fixed by the Executive Committee.

Mr. Hanning: I would say that there is a hearty welcome down south for the State Dairy Association.

On a vote being taken, Cambridge City was selected as the next annual meeting place.

Mr. Drischel: I thank you for the honor, and I will guarantee you thirty to fifty members, and plenty of good cheese besides.

Mr. Hanning: I think Mr. Macy omitted one thing, and that is that sorghum furnishes more food per acre than any other crop we have, and the cows like it and it makes good butter.

Mr. Macy: We have a sorghum factory here, and we make our sorghum cane into molasses.

President Woods: I grow something like eight acres, and we make our sorghum cane into milk.

Mr. Sykes: Did you ever try sorghum for silage?

Mr. Macy: No, sir.

Mr. Billingsley: I have tried it. It is no good, in my experience.

Dr. Hurty: Mr. Macy said water was cheap in Indiana. Go down in Ripley County and you will not find any water in the ground, and the people rely on cisterns entirely, and the watering of dairy cattle is done from surface ponds, and the water becomes very stagnant and full of decayed matter before the summer is over.

President Woods: There is a man in Kansas who hauls water seven miles, and a neighbor met him and said: "Why don't you dig a well?" He said: "I might as well go seven miles one way as the other."

Mr. Sykes: Our people along the shores of Lake Michigan are not bothered that way.

WHAT SHOULD THE BUTTER MAKER EXPECT OF THE PATRON?

BY HERBERT NEWBY, SPICELAND.

In writing this paper I know I have taken up one of the great subjects which confront the creamery man of to-day. It is one of the problems which comes up for discussion among both the factory men and also the patrons. As all creameries are co-operative in fact, whether in form or not, then success must depend upon the thoroughness of the co-operation of all parties concerned, and how to secure this to the greatest extent is the question. Co-operation means all parties concerned working together to accomplish some definite result.

In the first place, the butter maker must be a man who can gain and hold the respect of his patrons, and to do this his very word must be as good as his bond. He must work, and make his patrons feel that he is working for their good, and that he is watching after their interests in every way.

The best butter can only be made from the best milk, so the butter maker has the right and must expect his patrons to furnish him with the very best raw material (i. e., milk). By this I mean milk from good, healthy cows, which have had proper care, fed with good, wholesome feed, milked in a clean place, free from filth and foul odors. After the milk has been carefully drawn from the cow in a clean, sweet pail, it should at once be thoroughly strained and cooled, or, better still, also aerated.

Then comes the question how to deliver the milk at the factory in the very best condition, with all the fine flavor produced by nature retained, and with no artificial flavor added. One good way to do this is to have a good, clean cover of some kind to place over the cans, and in winter

it should be sufficient to keep the milk from freezing; then be sure your milk is at the factory on time. The butter maker need not expect anything of his patrons which he himself is not willing to do, so if he leaves things dirty and greasy, he may expect them to do the same way, and also to furnish him with poor milk; but if he is careful in every detail regarding cleanliness in his work, then he may expect his patrons to keep all their cans and other milk utensils sweet and clean, and to do this the utmost care and vigilance must be exercised. The cans are especially liable to become dirty and in bad shape unless they are carefully washed and scalded each time after using them, and plenty of good, bright sunshine will not hurt milk vessels in the least.

Too many persons seem to think a butter maker should be able to take any and all kinds of milk and work it up into the finest product. He can not do this. But furnish him with good milk, then hold him responsible.

We sometimes hear of a man being prosecuted for adulterating his milk with a little pure water, or taking out some of the butter fat, but I would rather (as the Babcock test would catch him) see a man prosecuted for adulterating his milk with filth, which no doubt his farm needs, for filth and dirt are the cause of more bad butter than anything else.

Some one may ask why the need of each patron being urged to take such good care of his milk? We would answer, Milk from an unhealthy cow is not fit food for a human being. If impregnated with filth, it is liable to have in it the germs of disease; if it comes in contact with foul odors or is allowed to sour, it gives the undesirable bacteria a big start, which can not be overcome. If milk is allowed to freeze, it can be detected in the butter; thus one can of bad milk may cause the whole day's make of butter to be off, and so cause a financial loss to each patron.

Every patron should constantly keep in mind the fact that the price he receives for his milk depends on the price the butter maker gets for his butter, and this in a large measure depends on the condition the milk is in when it reaches the hands of the butter maker.

Mr. Billingsley: Prof. Plumb has been at extra expense and a great deal of trouble and labor in the past two years in the interest of this Association. I think it no more than right we should vote him compensation, and I have drafted the following resolution:

Resolved, That we allow Prof. Plumb \$75 for past services as Secretary and Treasurer of this Association.

And I move its adoption.

Motion seconded and carried.

Mr. Billingsley: Be it further resolved, That the salary of the Secretary be fixed at \$50 per annum; and I move its adoption.

Motion seconded and carried.

REPORT OF COMMITTEE ON NOMINATIONS.

The Committee on Nominations presented the following names as officers of the Association for the ensuing year:

For President—J. J. W. Billingsley, Indianapolis.

For Vice-President—Geo. Drischel, Cambridge City.

For Secretary-Treasurer—H. E. VanNorman, Lafayette.

The above, together with Samuel B. Woods, Lottaville, and O. H. Mills, Mooresville, forming the Executive Committee.

COMMITTEE.

On motion, the report of the committee was approved, and the officers mentioned in the report declared elected.

The following resolution, submitted by Major Henry E. Alvord, and approved by the Committee on Resolutions, was adopted:

Resolved, That the Indiana State Dairy Association cordially indorses the recommendation of the Secretary of Agriculture in his recent annual report, that the present system of inspection of meat and meat products for export from this country be extended to include butter, cheese and condensed milk to be exported, and that the Congress of the United States be requested to soon provide the necessary legislation therefor.

Approved by Committee,

SAMUEL SCHLOSSER, Chairman.

REFINED MILK, PARTICULARLY REFERRING TO MODIFICATION, PASTEURIZATION AND STERILIZATION.

BY EDWARD N. EATON, M. S.

The condition of market milk in large cities calls for the indignant protest of its citizens. The water supply of Chicago, bad as it may be, is not responsible for as much sickness as polluted milk.

There is a striking contrast in the condition of milk sold for immediate consumption and that intended for the manufacture of butter, cheese and condensed milk.

To curtail a painful subject, market milk, or the babies' milk, is contaminated with dust, dirt and disease, feeble with age, and often stripped of its original nutriment. Manufacturers' milk is fresh, clean, pure, rich and wholesome, and treated according to the requirements of the purchaser.

In these manufacturing industries even slight differences in nutritive or hygienic quality affect the yield and grade of the finished product, and consequently represent a cash value. The first-class cheese maker demands untainted milk, and will refuse to pay for any other kind. The butter maker must have an article whose purity is above suspicion, and he pays only for the fat he finds. The condensed milk magnate buys milk under an ironclad contract, and devotes a page of the contract to purity, only a paragraph to price.

In our banner butter belt cows are fed, housed and handled with watchful skill; milk is guarded from germs, is properly cooled and aerated and purified by the centrifugal separation.

Contrast the condition of affairs existing in human and cattle foods. No money, labor or skill is spared in investigating, analyzing and compounding rations for the steer, an animal to be converted into dollars and cents. Man eats without the aid of a chemical balance or State appropriation. I do not wish to convey the impression that all this is solely attributable to mercenary motives. Lack of education or knowledge along these lines, even of the cultivated people, is largely responsible for unwholesome milk. I think the producer and dealer now sell as pure milk as a majority of the consumers are willing to pay for.

Text books on hygiene, giving due importance to the milk question, are needed in the public schools. It will not do to forget the old maxim, that "what is everybody's business is nobody's business," in explaining the apathy on the question of pure food.

There are several other methods of refining milk other than those included in my subject. I have selected these partly because of unusual opportunities for observation of their manufacture and usefulness, and partly to correct some very common errors concerning nomenclature and definitions. It will be convenient to consider them in inverse order to the capitalization.

Sterilization.—Sterile means free from life. Sterilized milk, therefore, is a milk devoid of living organisms. Consequently, if kept free from germs and sealed, it may be held indefinitely without change. It is immaterial how this result is attained, whether by chemicals, electricity, frigidity or heat.

In milk intended for table use one method only is practicable, that of high temperature. Submitting milk to a boiling temperature for a long time, several hours, accomplishes the end in view, but greatly impairs digestibility and palatability. Submitting to a temperature above boiling, under pressure, is less objectionable. The best results are obtained by intermittent heating and cooling, with a four hour period of incubation, or longer. If boiling temperatures are employed, two or three incubations are sufficient; if a less degree of heat, a longer time will be needed. Merely heating to boiling temperature will not sterilize milk.

The word sterilization, as applied to milk, has of late come to mean a milk treated in any way by heat. In the household it signifies a milk heated to boiling, which is a little improvement on the use of the term by manufacturers with "sterilizers" to sell. Such boiled milk is unquestionably free from pathogenic germs, keeps well, and is of considerable utility in the home preparation of milk for infants. Some appropriate name should be coined for it.

True sterilized milk, if properly prepared, is very slightly, if at all, colored, possesses a cooked but not unpleasant taste, with its nutritive properties unimpaired.

The albumen should not be coagulated, or, at any rate, separated, to form a scum on top, as in the usual boiled milk. Neither should the fat globules unite and float on top. Ordinary boiled milk is constipating in its effect. While my experience is not wide enough to state positively that sterilized milk does not act in this way, a sterilized modified milk certainly does not.

Pasteurization.— Pasteurization of milk grew out of a demand for a milk which should be free from pathogenic or disease producing bacteria, and retain the normal flavor and taste. Based on experiments of a number of chemists and bacteriologists, a certain procedure is recognized as accomplishing this result. This, in brief, is to heat from 160 degrees to 165 degrees Fahrenheit, hold at that temperature twenty to thirty minutes, and rapidly cool to fifty degrees or below. On account of the slight similarity of this process to the Pasteurization of wine named in honor of the originator, the great bio-chemist of the nineteenth century, the same term was applied to milk, not, as a director of one of our mid-west experiment stations said, because the process was practiced by Pasteur. Although Pasteurized milk may scarcely be detected by taste, yet it lacks an indefinite something, possibly the "Glame" of the Ralstonites, which gives to new milk its refreshing flavor. Certain it is that users of Pasteurized milk tire of it after a time. For this reason I doubt of its ever coming into general use.

As in the case of sterilized milk, the term Pasteurized has been twisted and stretched to include almost any kind of milk. Thus a milk heated sufficient to kill the "bacteria lactis," and thereby improve keeping qualities, is a Pasteurized milk. A skim milk subjected to a jet of exhaust steam is Pasteurized. A cream treated to 120 degrees to 140 degrees Fahr., from which improved butter is to be made, is perhaps the latest abuse of the term. Dairy literature is sadly in need of a term to distinguish the product of the so-called continuous Pasteurizers whose object is indiscriminately the destruction of souring bacteria, pathogenic bacteria, or the bacteria or ferments unfavorably affecting the ripening of cream.

It is not my intention to deeply probe the question of modified milk. It is an ascertained fact that cows' milk, be it ever so pure, is not a suitable food for a young child. Efforts toward improvement have been

made by additions of sucrose, lactose, maltose, lime water, the carbonated alkalies, cream and water. Even the vegetable kingdom has been invaded to furnish nutriment for the carnivorous child. A more commendable procedure is to precipitate a part of the protoids of milk by rennet, and by heating peptonize the remaining albuminoids.

Dr. Roach advocated and introduced into use the modified milk laboratory. Here milk is compounded according to physicians' prescriptions. Laboratories founded upon this principle, but, unfortunately, not closely following his methods, have been established in almost all the large Eastern cities. This procedure is advocated by those who believe in regulating the nutriments administered to a child by the proportion of ingredients rather than the quantity of food given. This is diametrically opposed to nature, brute or human. Nature secretes a milk of almost constant composition from beginning to end of the period of lactation. And not only in theory, but in practice, has a milk copied after nature been found preferable to the product of the modified laboratories.

The Germans estimate a great saving of life by the growing use of Gardner's, Stutzer's and other humatized milks. They are now being introduced in England. Mr. Strauss's experiments in New York City and Brooklyn, Mr. Sarg's in Philadelphia, and my own in Minneapolis indicate a great and useful future for sterilized, modified milk along lines of constant composition.

Thereupon the convention adjourned sine die.

REPORT TREASURER INDIANA STATE DAIRY ASSOCIATION.

From State Appropriation, Year Ending October 31, 1898.

C. S. Plumb, Treas., to Indiana State Dairy Association, Dr.

1897-98.		Dr.	Cr.
Nov. 26 and Dec. 21.	To postage	\$7 66	
Nov. 30 and Dec. 17.	To expressage Lewisville and Cedar Lake	55	
Nov. 25.	To programs 1897 meeting and newspaper slips	6 25	
Dec. 4.	To 500 blank receipts	2 50	
Dec. 13.	To 6 books and 100 score cards	5 00	
Dec. 28.	To C. D. Smith, expenses as lecturer at Dec. 31, 1897, meeting	21 61	
Dec. 30.	To T. L. Hacker, part payment as lecturer at 1897 meeting	20 00	
Dec. 30.	To T. L. Hacker, balance on account lecturer at 1897 meeting	47 40	
Nov. 16.	To expenses C. B. Benjamin on Executive Committee meetings, Dec. 30.....	25 00	
Nov. 16.	To expenses J. M. Knox on Executive Committee meetings, Dec. 27-28.....	8 55	

		Dr.	Cr.
Jan. 6.	To premium for prize essay, Mrs. Benjamin..	\$10 00	
Jan. 8.	To premium on first prize creamery butter, Spiceland Creamery	12 00	
Jan. 8.	To premium on second prize creamery butter, Wabash Creamery	8 00	
Jan. 8.	To premium on first prize dairy butter, Geo. S. Tappan	6 00	
Jan. 8.	To premium on second prize dairy butter, Mrs. Bartlett	4 00	
Jan. 8.	To premium on first prize cheese, Boyd & Drischel	10 00	
Jan. 8.	To premium on second prize cheese, Lewis- ville Creamery	5 00	
Jan. 15.	To 200 stamped envelopes	2 22	
Jan. 28.	To O. A. Stubbs, expenses on Executive Com- mittee, drayage, postage, etc.....	4 70	
Feb. 1.	To 500 letterheads, 300 circulars, 500 envel- opes	5 50	
Feb. 10.	To C. S. Plumb, expenses on Executive Com- mittee, and as Secretary, Lewisville and return	13 30	
Feb. 28.	To stenographic notes and transcript, 1897 meeting, O. A. Reser	40 00	
Jan. 2.	To expressage, Lewisville and Milwaukee, Feb. 12	2 00	
Feb. 9.	To 100 two-cent postage stamps.....	2 00	
Mar. 26.	To expressage from Chicago.....	25	
May 31.	To printing 1897 report, Home Journal Print- ing Company	230 88	
June 2.	By cash, Auditor of State, Nov. 16, \$100; Jan. 4, \$150; Mar. 5, \$100; June 2, \$150.....		\$500 00
	Total	\$499 07	
	Cash to balance	93	
		\$500 00	\$500 00

From State Appropriation, Year Ending October 31, 1899.

C. S. Plumb, Treas., to Indiana State Dairy Association, Dr.

1898.		Dr.	Cr.
Nov. 21.	To postage	\$8 50	
Dec. 5.	To postage	2 00	
Dec. 5.	To printing envelopes and programs.....	13 50	
Dec. 9.	To express charges on badges.....	70	

STATE DAIRY ASSOCIATION.

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	Dr.	Cr.
Dec. 9. To telegram	\$0 65	
Dec. 10. To expenses, C. S. Plumb, Mooresville, Dec. 2-3	6 65	
1897.		
Oct. 31. By cash brought forward, 1897-98 app.....		\$0 93
1898.		
Dec. 2. By cash from Auditor of State.....		100 00
	<hr/>	<hr/>
	\$32 00	\$100 93
To cash to balance account.....	68 93	
	<hr/>	<hr/>
	\$100 93	\$100 93

We, the Auditing Committee, find the report of the Secretary and Treasurer correct.

Signed: G. W. DRISCHSEL,
D. B. JOHNSON.

REPORT TREASURER INDIANA STATE DAIRY ASSOCIATION.

From Miscellaneous Income for Year 1897-98.

C. S. Plumb, Treas., to Indiana State Dairy Association, Dr.

	Dr.	Cr.
To deficit on 1896-97 account (see 1897 state- ment)	\$10 63	
1897.		
May 21. To expenses, J. M. Knox, attending Executive Committee meeting	2 10	
1898.		
Jan. 3. To balance due for printing report for 1896, Feb. 1, 1898.....	63 72	
1897.		
Nov. 24. To expenses annual meeting, 1896, etc., C. S. Plumb	6 35	
May 21. To expenses Executive Committee meeting, Oct. 4-9, 1897, and postage, C. S. Plumb...	6 39	
1898.		
Mar. 5. To expenses Executive Committee meeting, Indianapolis, January, 1896, J. S. Moore...	1 00	
Mar. 5. To expenses Executive Committee meeting, Indianapolis, Feb. 15, May 15, O. A. Stubbs	7 20	
Mar. 3. To expressage from Chicago	40	
Mar. 5. To expenses Executive Committee meeting, Lewisville, J. S. Moore.....	4 20	
Apr. 15. To cuts, 1897 report, Osgood & Co.....	11 85	

	Dr.	Cr.
May 28. To postage	\$11 25	
June 4. To cuts for 1897 report.....	4 80	
June 8. To postage	4 50	
Apr. 16. To expressage from Chicago.....	30	
Sept. 30. To expenses attending Executive Committee meeting, Indianapolis, S. B. Woods.....	10 50	
Sept. 30. To expenses attending Executive Committee meeting, Indianapolis, O. P. Macy.....	80	
Sept. 30. To expenses attending Executive Committee meeting, Indianapolis, C. S. Plumb.....	3 70	
Oct. 31. To postage	2 00	
	<hr/>	
	\$151 69	
Dec. 13. By cash for membership, Dec. 29, 1897, to Dec. 13, 1898.....		\$170 00
Cash on hand to balance account.....	18 31	
	<hr/>	<hr/>
	\$170 00	\$170 00

We, the Auditing Committee, find the report of the Secretary and Treasurer correct.

Signed: G. W. DRISCHEL,
D. B. JOHNSON.

CREAMERY BUTTER—ENTRIES AND SCORES. DECEMBER 14-15, 1898. MOORESVILLE, IND.

No.	NAME OF EXHIBITOR.	ADDRESS.	50 Flavor.	25 Grain.	10 Color.	10 Salt.	5 Pkg.	100 Total.
1	C. W. Lisman	Carlisle, Ind.	*					
2	W. V. Clifton	North Liberty, Ind.	47½	25	9½	10	5	97
3	Spiceand Creamery	Spiceand, Ind.	42	24½	8	10	5	90½
4	H. F. Rotermund	Bremen, Ill.	45	24½	9½	9½	5	93½
5	Wabash Creamery Co.	Wabash, Ind.	46	25	10	10	5	94
6	R. W. Furnas	Indianapolis, Ind.	46	24½	9	10	4½	94
7	D. M. Barber	Hanna, Ind.	47½	25	10	10	5	97½
8	Centerville Creamery	Centerville, Ind.	45	25	9	9½	4½	93½
9	H. Matthews	Brunswick, Ind.	46½	24½	10	9½	5	95½
10	Schlusser Bros.	South Chicago, Ill.	46	24½	10	9½	5	95
11	Perry L. Johnson	Prairie Creek, Ind.	45	24½	10	9½	5	94½
12	S. Holloway	North Manchester, Ind.	45	24½	10	9½	5	94½
13	Webster Creamery Co.	Webster, Ind.	45	24½	10	10	5	94½

DAIRY BUTTER.

1	L. W. Thomas	Elizabethtown, Ind.	47	25	9½	9½	5	96½
2	Arthur Headley	Oakley, Ind.	46	25	10	9½	5	95½
3	J. M. T. Welborn	Bridgeport, Ind.	45	25	9½	9½	5	94
4	Newsom Bros.	Valley Mills, Ind.	43	24½	9	9½	5	91
5	Mrs. Chas. Lamont	Joppa, Ind.	47	25	10	10	5	97

1. Genesee Salt. 4. DeLavel Separator. 7. United States Separator. 10. Wells-Richardson Butter Color.
 2. Worcester Salt. 5. Russian Separator. 8. Reid Separator. 11. Buckeye Salt.
 3. Diamond Crystal Salt. 6. Sharpless Separator. 9. Jumbo Separator.

* Exhibit not received. + Too much color or salt. — Not enough color or salt.

CHEESE—ENTRIES AND SCORES. DECEMBER 14-15, 1898. MOORESVILLE, IND.

No.	NAME OF EXHIBITOR.	Address.	30 Flavor.	30 Qual- ity.	20 Tex- ture.	10 Color.	10 Salt.	100 Total.	Age.
1	Wm. Nisbet	Hub City, Wis.	27½	27	19	9½+	10	93	3 mo. ¹
2	E. A. Haven	Bloomington, Mich.	27	28	17	9½-	10	91½	7 wks. ²
3	Wabash Creamery Co.	Wabash, Ind.	27	28	19	9-	9-	92	¹
4	Boyd & Drischel*	Cambridge City, Ind.	26	29	19	9½-	9½-	93	5 wks. ¹
5	Boyd & Drischel*	Cambridge City, Ind.	29	29½	19½	10	10	98	5 wks. ¹
6	Hugh Nisbet	Woodstock, Wis.	28	28	19	10	10	95	2½ mo. ¹
7	W. L. McCain	Hortonville, Ind.	28	27	19	9½-	9½-	93	. . . . .
8	Springport B. & C. Co.	Springport, Ind.	26	27	19	9½-	10	91½	. . . . .

¹ Genesee Salt. ² Diamond Crystal Salt. * Young Americans. + Too much color or salt. - Not enough color or salt.

PREMIUM AWARDS.

	<i>Points.</i>
Prize No. 1. Best tub creamery butter. Premium, \$15 cash.	
H. Matthews, Brunswick Creamery.....	97½
Prize No. 2. Second best tub creamery butter. Premium, \$10 cash.	
Spiceland Creamery, Spiceland	97
Prize No. 3. Third best tub creamery butter. Premium, \$5 cash.	
Perry L. Johnson, Prairie Creek Creamery.....	95½
Prize No. 4. Best five pounds dairy butter. Premium, \$10 cash.	
Mr. Chas. Lamont, Joppa	97
Prize No. 5. Second best five pounds dairy butter. Premium, \$8 cash.	
L. W. Thomas, Elizabethtown	96½
Prize No. 6. Third best five pounds dairy butter. Premium, \$4 cash.	
Arthur Hoadley, Ockley	95½
Prize No. 7. Best full-cream cheese. Premium, \$15 cash.	
Boyd & Drischel, Cambridge City.....	98
Prize No. 8. Second best full-cream cheese. Premium, \$10 cash.	
Hugh Nisbet, Woodstock, Wis.....	95
Prize No. 9. Third best full-cream cheese. Premium, \$5 cash.	
W. L. McCain, Hortonville.....	93
Prize No. 10. Best exhibit fancy cheese. \$5 cash.	
No entry.	
Prize No. 11. Best exhibit of cottage cheese. \$5 cash.	
L. W. Thomas, Elizabethtown.	
Prize No. 12. Second best exhibit of cottage cheese. \$3 cash.	
No entry.	

SPECIAL PREMIUMS.

DeLaval Separator Company, Chicago, Ill.—To butter maker receiving highest score on butter made exclusively from cream separated by DeLaval machine, open to dairymen and creamerymen alike. \$10 cash.	
Mrs. Chas. Lamont, Joppa.....	97
To butter maker receiving second highest score. \$5 cash.	
L. W. Thomas, Elizabethtown.....	96½
Wells & Richardson Company, Elgin, Ill.—Solid gold medal, engraved with winner's name, to creamery butter maker scoring highest with Wells & Richardson's butter color.	
H. Matthews, Brunswick.....	97½
To maker best dairy butter, colored with Wells & Richardson color. \$5 cash.	
Mrs. Chas. Lamont, Joppa.....	97

	<i>Points.</i>
By Vermont Farm Machine Company, Bellows Falls, Vt.—For package of butter receiving the highest score, provided it is made from cream separated by the Improved U. S. Cream Separator. \$10 cash.	
Harry Matthews, Brunswick.....	97½
By Worcester Salt Company, New York City.—To person making butter scoring highest, salted with Worcester Salt, a \$25 gold watch.	
H. Matthews, Brunswick.....	97½
To person making butter scoring second highest, salted with Worcester Salt, a \$15 gold watch.	
Herbert Newby, Spiceland.....	97
By Creamery Package Manufacturing Company, Chicago, Ill.—	
1. To winner of first premium creamery butter, one Ideal heater.	
H. Matthews, Brunswick.....	97½
2. To winner of second premium creamery butter, 30 sixty-pound, Elgin style, hand-made ash tubs.	
Herbert Newby, Spiceland Creamery.....	97
3. To winner of third premium creamery butter, 20 tubs, as per above.	
Perry L. Johnson, Prairie Creek.....	95½
4. To winner of first premium dairy butter, one two-bottle Ideal tester.	
Mrs. Chas. Lamont, Joppa.....	97
5. To winner of second premium dairy butter, one No. 1 Lakin strainer.	
L. W. Thomas, Elizabethtown.....	96½
6. To winner of third premium dairy butter, one Ideal family butter mold.	
Arthur Hoadley, Ockley.....	95½
7. To winner of first premium factory cheese, 500 excelsior band-ages, any size.	
Boyd & Drischel, Cambridge City.....	98
8. To winner second premium factory cheese, one Marshall rennet test.	
Hugh Nisbet, Woodstock, Wis.....	95
9. To winner third premium factory cheese, one Little Detective milk tester.	
W. L. McCain, Hortonville.....	93

APPENDIX.

BUTTER EXHIBITORS AND SCORES AT INDIANA STATE FAIR, INDIANAPOLIS, SEPTEMBER 12-16, 1898.
CREAMERY—60-LB. TUBS.

NAME OF EXHIBITOR.	ADDRESS.	Flavor.				Color.				Salt.				Style.				Total.			
		50	25	10	10	25	10	10	10	25	10	10	10	25	10	10	10	50	25	10	10
Robert McBeth (1)	Fairland	49½	24	94	94	49	8	94	94	5	5	5	5	94	94	94	94	94	94	94	94
Ossian Creamery Co	Ossian	49	23	9	9	49	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94
A. M. Folger	Dana	48	24	9	9	48	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94
A. M. Folger	Dana	48	24	9	9	48	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94
A. M. Folger	Dana	48	24	9	9	48	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94
Spiceland Creamery Co	Spiceland	48	23	10	10	48	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94

FARM DAIRY—15-LB. TUBS.

Peter Raab	Brightwood	49	24	8	8	49	94	94	94	5	5	5	5	94	94	94	94	94	94	94	94
Peter Raab	Brightwood	49	24	8	8	49	94	94	94	5	5	5	5	94	94	94	94	94	94	94	94
Zanetta Vance	Springport	48	23	84	84	48	84	84	84	5	5	5	5	94	94	94	94	94	94	94	94
Edna Neff	Syracuse	49	24	9	9	49	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94
Mrs. J. S. Neff	Syracuse	49	24	9	9	49	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94
Mrs. Drake (2)	Edinburg	484	24	9	9	484	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94
Arthur Hoadley (1)	Oakley	484	24	9	9	484	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94

FARM DAIRY PRINTS—5-LBS.

Mrs. A. Sample.	Indianapolis	49	24	9	9	49	84	84	84	5	5	5	5	94	94	94	94	94	94	94	94
Mrs. Drake (2)	Edinburg	49½	24	9	9	49½	84	84	84	5	5	5	5	94	94	94	94	94	94	94	94
Unknown.	Edinburg	48	23	9	9	48	84	84	84	5	5	5	5	94	94	94	94	94	94	94	94
Harvey Johnson	Logan, Iowa	49	24	9	9	49	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94
Arthur Hoadley (1)	Oakley	49	24	8	8	49	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94
Peter Raab	Brightwood	49	24	9	9	49	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94
Mrs. J. S. Neff.	Syracuse	49	24	9	9	49	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94
Unknown	Edinburg	48	23	8	8	48	9	9	9	5	5	5	5	94	94	94	94	94	94	94	94

APPENDIX—Continued.

GIRLS UNDER 20 YEARS OF AGE.

NAME OF EXHIBITOR.	ADDRESS.	50	25	10	10	5	10
		Flavor.	Grain.	Color.	Salt.	Style.	Total.
Edna Noff (1)	Syracuse Indianapolis	49	24	94	9	5	96
Miss Coffin (2)		484	24	94	84	5	96
CHEESE.							
A. Schoenman (1)	Plain, Wisconsin Cambridge City, Indiana North Salem, Indiana						984
Boyd & Drischel (2)							984
J. A. Hadley							96

PURE FOOD LAW, PASSED BY INDIANA LEGISLATURE, 1899.

A bill for an act forbidding the manufacture, sale, or offering for sale, of any adulterated foods or drugs, defining foods and drugs, stating wherein adulteration of foods and drugs consist, and defining the duties of the State Board of Health in relation to foods and drugs, their inspection, purity, adulteration, declaring penalties for the violation of the laws, rules and ordinances concerning foods and drugs, also liquors used or intended for drink, repealing acts in conflict therewith, and declaring an emergency.

Section 1. Be it enacted by the General Assembly of the State of Indiana, That no person shall, within this State, manufacture for sale, offer for sale or sell any drug or article of food which is adulterated, within the meaning of this act. The term "drug," as used in this act, shall include all medicines for internal or external use, antiseptics, disinfectants and cosmetics. The term "food," as used herein, shall include confectionery, condiments, and all articles used for food or drink by man. An article shall be deemed to be adulterated, within the meaning of this act: a. In the case of drugs, (1) when sold under or by a name recognized by the United States Pharmacopœia, it differs from the standard of strength, quality or purity laid down therein, unless the order calls for an article inferior to such standard, or unless such difference is made known or so appears to the purchaser at the time of such sale; (2) if when sold under or by a name not recognized in the United States Pharmacopœia, but which is found in some other pharmacopœia or other standard work on materia medica, it differs materially from the standard of strength, quality or purity laid down in such work; (3) if its strength or purity falls below the professed standard under which it was sold. b. In the case of food, (1) if any substance or substances have been mixed with it so as to reduce or lower or injuriously affect its quality or strength; (2) if any inferior or cheaper substance or substances have been substituted wholly or in part for it; (3) if any valuable constituent has been wholly or in part abstracted from it; (4) if it is an imitation of or sold under the name of another article; (5) if it consists wholly or in part of a diseased, decomposed, putrid or rotten animal or vegetable substance, whether manufactured or not, or in the case of milk, if it is the product of a diseased animal; (6) if it is colored, coated, polished or powdered whereby damage is concealed, or if it is made to appear better or of greater value than it really is; (7) if it contains any added poisonous ingredient, or any ingredient which may render it injurious to the health of the person consuming it. The provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles of food or drink: Provided, That the same are not injurious to health, and are distinctly labeled as mixtures or compounds;

and no prosecutions shall at any time be maintained under said act concerning any drug the standard of strength or purity whereof has been raised since the issue of the last edition of the United States Pharmacopœia, unless and until such change of standard has been published throughout the State.

Sec. 2. It shall be the duty of the State Board of Health to enforce the laws of the State governing food and drug adulteration; and the State Health Officer shall be the State Inspector of Foods and Drugs. The State Board of Health shall take cognizance of the interests of the public health relating to the sale of drugs and foods, and the adulteration of the same, and shall make all necessary investigations and inquiries in reference thereto; and for these purposes the State, county, city and town health officers shall be food and drug inspectors, subordinate to the State Board of Health. Within ninety days after the passage of this act the State Board of Health shall adopt such measures as may be necessary to facilitate the enforcement hereof, and shall prepare rules and ordinances where and when necessary, regulating minimum standards for foods and drugs, defining specific adulterations, and declaring the proper methods of collecting and examining drugs and articles of food. Every person offering or exposing for sale or delivering to a purchaser any drug or article of food included in the provisions of this act, shall furnish to any analyst or other officer or agent appointed hereunder, who shall apply to him for the purpose, and shall tender to him the value of the same, a sample sufficient for the purpose of the analysis of any such drug or article of food which is in his possession. Whoever hinders, obstructs or in any way interferes with any inspector, analyst or other officer appointed hereunder in the performance of his duty, and whoever violates any of the provisions of this act, shall, upon conviction, be fined in any sum not exceeding \$100. Whoever fraudulently adulterates, for the purpose of sale, bread or any other substance intended for food with any substance injurious to health, or knowingly barter, gives away, sells, or has in his possession with intent to sell, any substance injurious to health, shall be fined in any sum not exceeding \$100, and the article so adulterated shall be forfeited and destroyed, under the direction of the court. Whoever adulterates, for the purpose of sale, any liquor used or intended for drink, and whoever knowingly sells any such liquor so adulterated, shall be punished by fine of not less than one hundred nor more than five hundred dollars, and the article so adulterated shall be forfeited and destroyed according to the order of the court.

Sec. 3. All acts and parts of acts in conflict with the provisions of this statute are hereby repealed.

NOTE. The national oleomargarine and the filled cheese laws are printed in full in the 1897 report of the Dairy Association.

AMERICAN DAIRY JOURNALS.

The publishers of these journals will no doubt gladly send copies to those who may apply for them:

American Cheese Maker, Grand Rapids, Mich. Monthly.

American Dairyman, New York City, N. Y. Weekly.

Chicago Produce, Chicago, Ill. Weekly.

Creamery Gazette, Des Moines, Ia. Monthly.

Creamery Journal, Waterloo, Ia. Monthly.

Dairy and Creamery, Chicago, Ill. Semi-monthly.

Dairy World, Chicago, Ill. Monthly.

Elgin Dairy Report, Elgin, Ill. Weekly.

Hoard's Dairyman, Fort Atkinson, Wis. Weekly.

Jersey Bulletin and Dairy Farmer, Indianapolis, Ind. Weekly.

Milk News, Chicago, Ill. Semi-monthly.

New York Produce Review and American Creamery, New York City. Weekly.

Practical Dairyman, Indianapolis, Ind. Monthly.

St. Paul Dairy Reporter, St. Paul, Minn. Weekly.

• "These Bones Shall Rise Again."

PURDUE UNIVERSITY.

COMMERCIAL FERTILIZERS

H. A. HUSTON, State Chemist.
W. J. JONES, JR., Assistant.

Special Bulletin, August, 1899.

It has been the custom of the State Chemist to give brief statistics of the sales of fertilizers in Indiana. These statistics have been based on sales of tags for two hundred pound packages. The use of the hundred pound sack has increased to such an extent that it is not considered advisable to use tag sales as the basis of estimated sales. It is claimed by manufacturers that a very large part of the sales is in one hundred pound sacks. On the other hand, consumers say that the one hundred pound sack is only used to a limited extent. My own observation in different parts of the State leads me to think that most of the goods sold last year were in two hundred pound packages. Unless this were so there must have been a marked falling off in the sales of fertilizer. But the sales are reported heavier than usual, and the acreage of wheat unusually large. The sales probably approximated 60,000 tons.

The last Legislature amended the fertilizer law so as to provide for field inspection. The original law was passed in 1881. The law was doubtless written with the best of intentions, but the parties who would have to administer it were not consulted, and a grave error was made in not providing for inspection of goods actually found in the open market. For the past eighteen years the State Chemist has continued to urge that this should be provided for, and bills for this purpose have been introduced at nearly every session of the Legislature. For various reasons these bills have failed to pass. Inspections of goods on the market showed that some manufacturers were guilty of the grossest fraud, and, if the inspections fairly represented the State of the fertilizer business, as I believe they did,

farmers were obtaining much less plant food in their fertilizer than they were legally entitled to. The loss from this source each year was more than twice as much as the cost of a session of the Legislature.

For some years the official chemists and the eastern fertilizer manufacturers have held consultations through committees for the purpose of arriving at an agreement which should form the basis of uniform, effective and just fertilizer legislation. Such an agreement was reached last November, and three bills based on this agreement were introduced into the Indiana Legislature. The change from our old law was of course a great one and it was found impracticable to pass either of these bills. However, the opposition was put on record as being in favor of field inspection, and then a simple amendment to section 5, of the old law, providing for field inspection, was passed. In the House Representative A. A. Cravens and in the Senate Senator Patten were especially interested in the matter, introducing the bills and working most earnestly for their passage, yet the bill which is now the law does not bear the name of either of these gentlemen, but is the bill introduced by Representative Catley at the request of Representative Cravens. The law as amended went into effect on April 28, 1890, and is as follows:

SAMPLE SUBMITTED TO STATE CHEMIST.—AFFIDAVIT.

Section 1. Before any person shall sell, or offer or expose for sale, in this State, any commercial fertilizer for manurial purposes, he shall first furnish to the State Chemist of this State a quantity of such commercial fertilizer sufficient for analysis, accompanied with an affidavit that the substance so furnished is a fair and true sample of a preparation which the person so furnishing desires to sell within the State of Indiana for manurial purposes.

ANALYSIS.—LABEL.

Sec. 2. It shall be the duty of the State Chemist to make a chemical analysis of every sample furnished him, and to print the result of such analysis in the form of a label. Such label shall be plainly printed in the English language and shall set forth the name of the manufacturer, the place of manufacture, the ingredients contained in the preparation, showing particularly, in an available form, the percentage therein contained of nitrogen or its equivalent in ammonia, of potash soluble in water, of soluble and reverted phosphoric acid, and of insoluble phosphoric acid, with the certificate of such Chemist that the foregoing is a true and complete analysis of the sample furnished him, and shall furnish to one or more agricultural papers published in the State a true copy of said analysis: Provided, The same may be printed without cost. The State Chemist shall furnish such labels to persons so desiring to sell, or offer or expose to sale,

the fertilizer so analyzed, in such numbers as such person may desire: Provided, That the State Chemist shall not be required to furnish a less number than five hundred at any one time, and shall only be required to furnish them in multiples of five hundred.

LABELS TO BE AFFIXED.

Sec. 3. Every box, barrel, keg or other package of any substance, or any quantity of any substance, in any shape or form whatever, sold or offered for sale as a commercial fertilizer, shall have attached to it, in a conspicuous place, a label containing a certified analysis made by the State Chemist from a fair and true sample of the substance to which such label is attached, as provided in the foregoing section of this act.

SELLING WITHOUT LABEL PUNISHED.

Sec. 4. Any person who shall sell, or offer or expose to sale as a commercial fertilizer, any box, barrel, keg, or other package of any substance, or any quantity of any substance, in any shape or form whatever, which shall not be labeled with the State Chemist's analysis, as hereinbefore provided, or which shall be labeled with a false or inaccurate analysis, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be fined in the sum of fifty dollars for the first offense and one hundred dollars for each subsequent offense.

STATE CHEMIST.—FEES.

(As Amended.)

Sec. 5. The Professor of Agricultural Chemistry at Purdue University is hereby constituted the State Chemist of Indiana, and it shall be his duty to comply with the provisions of this act so far as they relate to him, and for his expenses and compensation in inspecting and analyzing fertilizers he shall receive for analyzing a sample of fertilizer and making his certificate of the same two dollars, for labels furnished, one dollar per hundred. The State Chemist or any person by him deputized is hereby empowered to procure from any package of commercial fertilizer offered for sale or found in Indiana a quantity of fertilizer not exceeding two pounds: Provided, Such sample shall be drawn during reasonable business hours, or in the presence of the owner of the fertilizer, or of some party claiming to be the representative of the owners. Any person who shall prevent or strive to prevent the State Chemist, or any person deputized by the State Chemist, from inspecting and obtaining samples of fertilizers, as provided for in this act, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than fifty dollars for the first offense and not less than one hundred dollars for each subsequent offense. The State Chemist is hereby empowered to prescribe and enforce such rules and regulations relating to fertilizers as he may deem necessary to carry into effect the full intent and meaning of this act.

TERM "COMMERCIAL FERTILIZER" DEFINED.

Sec. 6. The term "commercial fertilizer" as used in this act shall be taken to mean any and every substance imported, manufactured, prepared or sold for fertilizing or manurial purposes, except barnyard manure, marl, lime, wood ashes and plaster.

While this law as amended is far from being the best, it is a distinct advance over the original law and corrects its most serious defect. The law is still defective in that a heavy expense is incurred in making analyses of factory samples instead of permitting the entire revenue to be used for inspection work. The law should be further amended so as to permit the manufacturers' actual guarantee to be printed on the tag, and all analyses should be of samples drawn from the open market for the purpose of finding out if these guarantees were maintained. However, the consumers of fertilizers have reason to congratulate themselves that an inspection is now possible and that such manufacturers as have been furnishing goods that did not conform to the legal standard will be obliged to mend their ways. Inspectors are now in the field, but the work this spring will be largely preliminary, and the majority of the goods will not be inspected until shipment of wheat fertilizers begins.

It may be well to caution local dealers and farmers who act as fertilizer manufacturers' agents that in case goods are sold or offered for sale which do not conform to the legal standard as shown by the State Chemist's tag, or which do not bear the tag of the State Chemist on each package, the penalty falls on the local dealer or agent directly. It would, therefore, be advisable for dealers and agents to insert in their contract with the manufacturer a clause to the effect that the manufacturer will compensate dealers and agents for fines and costs incurred because of the failure of the manufacturer to furnish goods up to the legal standard and properly tagged.

On the other hand, it may be well to call the attention of manufacturers to the fact that in composition the goods must equal the standard shown on the tag in every respect; that if the goods fall below the analysis on the tag in any particular there is but one course to be taken by this office, and that is to report the case to the prosecutor of the county where the goods were found. The manufacturers have the privilege of setting any standard they may desire and of sending their own sample to establish this standard, but when this standard is thus established it must be strictly maintained. The change in the law does not provide any additional revenue, but greatly increases the work and cost of administering the law, since traveling expenses of inspectors must be met and a great number of additional analyses must be made. Inspectors have been selected who have been trained for this work, and official inspections will be for the present confined to samples drawn by these trained men.

Few people realize how difficult it really is to draw correct samples of certain kinds of mixed fertilizers. Unless the sample is correct, the work is worse than useless, and an injustice is done to all parties concerned; as the amount of work that can be done is limited by the revenue available, it is believed that this work should be confined to samples that are as nearly correct as it is possible to get them. We shall at all times be glad to learn from consumers and dealers what brands are on sale in their localities, and such information will be valuable to us in making out the routes of inspectors.

An impression seems to prevail in certain quarters that only new goods are subject to inspection. This is incorrect. Any goods that are for sale are subject to inspection, and all goods, new or old, must have tags attached to every package. This applies to half-pound packages of fertilizers for house plants as well as to fertilizers for ordinary farm crops.

TABLE OF FERTILIZERS LEGALLY ON SALE IN INDIANA, AUGUST, 1899.

NAME OF FERTILIZERS.		MANUFACTURERS.										Number.
Number.		Per Cent. Soluble Phosphoric Acid.	Per Cent. Reverted Phosphoric Acid.	Per Cent. Insoluble Phosphoric Acid.	Per Cent. Total Phosphoric Acid.	Per Cent. of Ammonia.	Per Cent. of Potash.	Relative Value per Ton.	Number.			
463	Zell's Calvert Guano.....	9.19	2.01	1.42	12.62	1.00	1.43	\$20.96	463			
464	Zell's Electric Phosphate.....	9.08	2.26	2.06	13.40	0.06	2.32	19.66	464			
465	Zell's Dissolved Bone Phosphate.....	13.27	2.01	0.00	15.28	0.06	0.00	18.34	465			
485	Soft Bone	0.00	11.90	3.69	21.49	4.95	0.00	23.89	485			
684	Premium Raw Bone Meal.....	0.00	8.57	17.68	26.25	5.02	0.00	33.44	684			
691	Economizer Phosphate	7.18	3.93	2.17	13.28	1.14	1.42	21.55	691			
719	Lister's U. S. Phosphate	8.62	2.65	1.29	12.66	2.44	3.36	27.65	719			
727	Anchor Brand Complete Fertilizer.....	0.14	4.16	6.37	10.67	5.05	2.65	26.90	727			
733	Excellenza Soluble Guano.....	4.30	6.42	0.92	11.64	2.75	1.33	25.22	733			
753	Challenge Crop Grower	5.19	6.20	1.15	12.54	1.20	1.51	21.82	753			
754	Elm Bone Phosphate	11.19	3.58	0.36	15.13	0.00	0.00	17.72	754			
755	Half and Half	8.66	3.94	0.88	13.48	1.29	0.78	23.90	755			
875	Pure Raw Bone	0.00	6.16	14.64	20.80	3.95	0.00	26.44	875			
904	Anchor Brand Wheat Grower	1.34	1.75	11.23	14.32	3.79	0.23	20.46	904			
999	Soft Bones	0.00	7.53	16.78	24.31	3.95	0.00	28.90	999			
1161	Lister's Animal Bone and Potash No. 2.	8.06	2.24	0.86	11.15	0.00	2.72	18.01	1161			
1249	Zell's Ammoniated Bone Superphos.....	8.19	2.55	0.99	11.53	2.89	3.12	27.99	1249			
1300	Crown Phosphate and Potash.....	7.23	5.37	3.08	15.53	0.00	2.28	21.47	1300			
1326	M. E. Wheeler & Co.'s H. G. Pure G'd Bone	0.00	11.93	21.21	33.14	1.56	0.00	27.58	1326			
1327	M. E. Wheeler & Co.'s H. G. Elect. Dis. Bo.	9.29	3.95	1.04	14.29	0.00	0.00	15.90	1327			
1328	M. E. Wheeler & Co.'s H. G. Roy. Wh. G'r.	6.79	2.09	0.38	9.26	1.50	2.85	19.90	1328			
1329	M. E. Wheeler & Co.'s H. G. Corn Fert.	6.40	1.81	1.19	9.40	2.47	2.17	19.98	1329			
1330	M. E. Wheeler & Co.'s H. G. G. & O. Fert.	8.64	3.13	0.73	12.50	0.00	2.19	19.40	1330			
1331	M. E. Wheeler & Co.'s H. G. Potato Man.	7.10	1.89	1.14	10.13	2.77	8.14	25.12	1331			
1341	Old Reliable Br'd Special Corn Grower	2.23	3.40	4.72	10.35	4.64	1.43	25.41	1341			

TABLE OF FERTILIZERS—Continued.

Number.	NAME OF FERTILIZERS.	MANUFACTURERS.	Per Cent. Soluble	Per Cent. Reverted	Per Cent. Insoluble	Per Cent. Total	Per Cent. of Ammonia.	Per Cent. of Potash.	Relative Value per Ton.	Number.
			Phosphoric Acid.	Phosphoric Acid.	Phosphoric Acid.	Phosphoric Acid.	Phosphoric Acid.	Phosphoric Acid.		
1343	Pure Ground Raw Bone.....	Zell Guano Co., Baltimore, Md.....	0.00	7.24	14.09	21.33	4.67	0.00	28.94	1343
1401	Umbreit Bone Dust.....	Chas. Umbreit, New Albany, Ind.....	0.00	0.00	13.84	20.02	4.68	0.00	28.05	1401
1441	Urbana Annual Tankage and Guano..	The Loudenback Fertilizer Co., Urbana, O..	8.10	2.11	0.14	10.35	0.09	0.22	14.38	1441
1444	Old Reliable Br'd Special Wheat Fert.	S. Kaufman & Sons, Indianapolis, Ind.....	2.46	3.31	4.75	10.52	4.59	1.41	26.39	1444
1467	Star Brand.....	Dryfus Pack. & Prov. Co., Lafayette, Ind.....	0.00	3.08	5.04	8.12	10.40	0.56	37.56	1467
1472	German Phosphate.....	The Farmer's Fert. Co., Indianapolis, Ind..	0.96	5.42	10.06	16.44	2.75	4.25	26.81	1472
1488	Anchor Br'd Corn and Wheat Grower.	A. B. Mayer Mfg. Co., St. Louis, Mo.....	3.68	2.94	4.84	11.46	3.89	2.41	25.77	1488
1500	D. & K. Wheat Fertilizer.....	Dockweiler & Kingsbury, Indianapolis, Ind.	4.06	4.01	9.17	17.24	3.23	1.47	26.42	1500
1503	Dissolved Bone and Potash.....	Marengo Mfg. Co., Marengo, Ind.....	4.87	2.22	0.64	7.73	4.16	5.81	29.63	1503
1514	Raw Bone Meal.....	Marengo Mfg. Co., Marengo, Ind.....	0.00	5.74	14.00	19.74	5.39	0.00	29.99	1514
1516	Niagara Queen City Phosphate.....	Niagara Fertilizer Works, Buffalo, N. Y.....	10.18	2.19	0.88	13.25	0.00	0.00	14.84	1516
1517	Niagara Grain and Grass Grower.....	Niagara Fertilizer Works, Buffalo, N. Y.....	5.67	1.50	4.10	11.27	1.73	1.53	18.70	1517
1524	Half and Half.....	Marengo Mfg. Co., Marengo, Ind.....	0.04	4.17	11.95	16.15	5.74	3.81	32.46	1524
1528	Butcher Bone and Potash Mixture.....	South Indiana Fert. Co., Roanville, Ind..	3.75	4.67	10.08	18.51	2.98	6.75	29.49	1528
1542	Old Reliable Brand P. H. Bone.....	S. Kaufman & Sons, Indianapolis, Ind.....	0.00	5.97	12.87	18.84	4.53	0.00	26.78	1542
1548	Pure Bone Meal.....	The Farmer's Fert. Co., Indianapolis, Ind..	0.00	7.23	22.73	29.96	2.47	0.00	28.98	1548
1561	D. & K. Crop Grower.....	Dockweiler & Kingsbury, Indianapolis, Ind.	0.00	8.63	11.21	19.84	2.86	1.90	27.75	1561
1562	Crocker's Ground Bone Meal.....	Crocker Fert. & Chem. Co., Buffalo, N. Y.....	0.00	10.21	13.65	23.86	2.68	0.00	26.48	1562
1564	Crocker's Niagara Phosphate.....	Crocker Fert. & Chem. Co., Buffalo, N. Y.....	10.94	2.11	0.14	13.09	0.00	0.00	15.06	1564
1566	Crocker's Superior Alkaline Bone.....	Crocker Fert. & Chem. Co., Buffalo, N. Y.....	9.11	2.46	0.13	11.69	0.00	1.38	17.89	1566
1568	Crocker's Potato, Hop & Tobacco Phos.	Crocker Fert. & Chem. Co., Buffalo, N. Y.....	8.44	1.95	0.77	11.16	2.52	3.42	26.82	1568
1571	Crocker's Am. Wheat and Corn Phos..	Crocker Fert. & Chem. Co., Buffalo, N. Y.....	7.15	2.51	1.28	11.54	2.46	1.96	24.61	1571
1582	D. & K. Qk Acting Wh. & C. Grower.	Dockweiler & Kingsbury, Indianapolis, Ind.	9.10	3.71	4.49	17.30	2.40	1.83	29.13	1582
1583	M. E. Wheeler & Co.'s H. G. Fruit Fert.	M. E. Wheeler & Co., Rutland, Vt.....	11.16	0.83	0.33	12.42	0.00	8.82	27.64	1583
1673	Half and Half.....	S. Kaufman & Sons, Indianapolis, Ind.....	5.09	4.78	7.37	17.24	2.90	0.00	24.87	1673

1674 Soluble Bone and Potash.....	3.63	4.42	5.56	13.61	2.15	1.98	22.32	1674
1703 Ohio Valley Phosphate.....	7.10	3.37	3.79	14.26	2.34	1.79	25.34	1703
1714 Anchor Brand Pure Bone Meal.....	0.00	5.96	17.23	23.19	4.81	0.00	30.68	1714
1716 D. & K. Dissolved Bone and Potash.....	3.25	2.77	5.56	11.58	2.15	2.42	20.01	1716
1725 Fine Raw Bone Fertilizer.....	0.00	5.39	16.84	22.23	4.25	0.00	28.31	1725
1727 Indian Brand Gilead Phosphate.....	4.22	3.83	5.87	13.92	2.24	2.16	25.90	1727
1728 Lister's Special Wheat Fertilizer.....	6.97	3.40	1.68	12.06	3.03	2.19	25.90	1728
1734 No. 1 Dissolved Bone.....	1.21	4.79	0.46	16.46	0.00	0.00	19.20	1734
1735 No. 4 Dissolved Bone.....	5.62	0.27	8.71	8.71	0.00	0.00	10.13	1735
1736 I. X. L. Ground Bone.....	0.00	1.57	11.45	13.02	2.69	0.00	17.13	1736
1737 Favorite Bone Phosphate.....	5.49	3.35	0.36	9.20	0.00	1.96	14.87	1737
1738 Atlas Bone Phosphate.....	6.27	3.18	1.32	10.77	2.07	2.91	23.46	1738
1739 Soluble Bone Phosphate.....	4.38	3.10	0.96	8.44	1.22	3.06	18.13	1739
1761 Soluble Bone.....	1.10	5.95	1.28	18.33	0.00	0.00	20.46	1761
1762 M.E. Wheeler & Co.'s H.G. Pure Raw Bo.....	0.00	7.21	15.51	22.72	4.83	0.00	30.39	1762
1769 D. & K. Bone Phosphate.....	8.14	4.32	0.64	13.10	0.00	1.11	19.03	1769
1770 D. & K. Fine Ground Bone.....	0.00	7.90	23.00	30.90	2.76	0.00	29.91	1770
1771 Crocker's Prac. Am. Superphosphate.....	6.38	2.28	1.31	9.97	1.45	1.28	18.53	1771
1772 Crocker's General Crop Phosphate.....	5.01	1.86	0.78	7.65	1.52	1.48	16.27	1772
1780 Crocker's New Rival Am. Superphos.....	8.49	1.55	1.05	11.09	1.82	2.01	22.35	1780
1781 Crocker's Universal Grain Grower.....	5.53	1.74	0.56	7.83	1.54	3.30	18.98	1781
1782 Crocker's Erie Fertilizer.....	9.35	1.76	1.62	12.73	0.00	0.00	13.33	1782
1815 Universal Phosphate.....	7.56	4.21	.481	16.53	1.76	1.98	26.06	1815
1816 Half and Half.....	6.43	3.79	5.32	15.54	3.83	0.00	27.93	1816
1825 Dissolved Bone and Potash.....	8.94	2.84	2.78	14.56	2.19	3.42	28.28	1825
1826 Pure Ground Bone.....	0.00	6.47	15.30	21.77	4.36	0.00	28.32	1826
1827 Soluble Bone.....	9.83	3.44	2.88	16.25	1.20	1.99	25.85	1827
1848 Peerless Bone.....	0.35	5.07	5.01	10.43	6.91	4.72	35.99	1848
1850 Homestead Potato Grower.....	7.28	2.24	1.92	10.44	2.91	6.13	29.78	1850
1851 Jarvis' Drill Phosphate.....	5.65	2.24	0.09	8.98	1.59	0.96	17.40	1851
1853 Red Line Phosphate with Potash.....	1.49	9.24	1.88	12.70	0.00	2.68	19.12	1853
1854 Red Line Ammoniated Phosphate.....	5.97	2.25	2.85	11.07	2.22	0.00	19.31	1854
1856 Banner Raw Bone.....	0.00	6.04	15.63	21.67	4.56	0.00	28.85	1856
1878 Illinois Zinc Co.'s Acid Phosphate.....	13.75	4.05	0.78	18.58	0.00	0.00	21.36	1878
1888 M.E. Wheeler & Co.'s H.G. Wh. & C. Fert.....	9.07	3.12	0.65	12.84	0.00	2.34	20.13	1888
1902 Fine Ground Bone.....	0.00	9.65	14.30	23.95	4.45	0.00	30.12	1902
1916 Barker's Harvest Bone.....	8.78	3.39	1.30	13.45	0.92	1.87	19.33	1916
1917 Barker's Wheat Grower.....	4.35	6.01	4.06	14.42	0.02	1.46	17.88	1917
1918 Barker's Bone Meal.....	0.00	5.04	20.09	25.13	2.27	0.00	24.40	1918
1919 Half Pure K.B. & H.F. Pure Bone Phos.....	4.38	6.56	12.55	23.28	3.28	0.00	30.09	1919

TABLE OF FERTILIZERS—Continued.

Number.	NAME OF FERTILIZERS.	MANUFACTURERS.	Per Cent. Soluble Phosphoric Acid.	Per Cent. Reverted Phosphoric Acid.	Per Cent. Insoluble Phosphoric Acid.	Per Cent. Total Phosphoric Acid.	Per Cent. of Ammonia.	Per Cent. of Potash.	Relative Value Per Ton.	Number.
1920	Pig Foot Bone.....	The E. Rauh & Son's Fert. Co., Indpls., Ind.	0.00	6.30	16.32	22.62	4.33	0.00	28.82	1920
1921	Raw Bone.....	The E. Rauh & Son's Fert. Co., Indpls., Ind.	0.00	5.86	20.49	26.35	4.56	0.00	32.13	1921
1923	Special Corn, Potato and Tobacco Fert.	The E. Rauh & Son's Fert. Co., Indpls., Ind.	8.03	2.75	3.34	14.12	3.87	6.81	31.41	1923
1925	Bowker's Dissolved Bone Phosphate.....	Bowker Fertilizer Co., Boston, Mass.	6.32	4.86	1.56	12.74	0.00	0.00	13.42	1925
1926	Bowker's Sure Crop Bone Phosphate.....	Bowker Fertilizer Co., Boston, Mass.	7.13	3.17	2.30	12.60	1.33	2.65	22.51	1926
1927	Bowker's Dis. Bone Phos. with Potash.	Bowker Fertilizer Co., Boston, Mass.	4.39	5.83	4.12	14.34	0.00	1.45	17.70	1927
1928	Bowker's Ammoniated O. I. O. Phos.	Bowker Fertilizer Co., Boston, Mass.	7.87	3.76	1.74	13.37	1.09	0.00	20.25	1928
1930	Bone Meal.....	Milsom Rend. & Fert. Co., E. Buffalo, N. Y.	0.00	8.09	15.86	23.95	4.22	0.00	29.43	1930
1940	Crocker's Animal Bone and Potash.....	Crocker Fert. & Chem. Co., Buffalo, N. Y.	0.00	3.51	11.92	15.43	1.93	1.40	18.27	1940
1944	Wheat, Oats and Barley Phosphate.....	Milsom Rend. & Fert. Co., E. Buffalo, N. Y.	9.33	0.91	0.09	10.33	1.88	2.62	23.23	1944
1946	Pure Bone.....	S. Kaufman & Sons, Indianapolis, Ind.	0.00	8.70	18.93	27.63	3.04	0.00	28.46	1946
1948	Cyclone Bone.....	Milsom Rend. & Fert. Co., E. Buffalo, N. Y.	0.00	7.50	16.99	24.49	4.69	0.00	31.21	1948
1950	Dissolved Bone.....	Milsom Rend. & Fert. Co., E. Buffalo, N. Y.	11.56	1.27	0.05	12.88	0.00	0.00	15.40	1950
1951	Dissolved Bone and Potash.....	Milsom Rend. & Fert. Co., E. Buffalo, N. Y.	10.78	1.00	0.04	11.82	0.00	1.99	18.90	1951
1952	Buffalo Guano.....	Milsom Rend. & Fert. Co., E. Buffalo, N. Y.	7.50	0.88	0.05	8.43	1.36	4.48	21.21	1952
1953	Buffalo Fertilizer.....	Milsom Rend. & Fert. Co., E. Buffalo, N. Y.	7.87	0.94	0.18	8.99	2.37	2.27	22.24	1953
1954	Corn Fertilizer.....	Milsom Rend. & Fert. Co., E. Buffalo, N. Y.	7.32	1.16	0.24	9.22	3.10	2.56	25.06	1954
1955	Erle King.....	Milsom Rend. & Fert. Co., E. Buffalo, N. Y.	7.55	0.96	0.17	8.68	1.45	2.49	19.32	1955
1956	Vegetable Bone Fertilizer.....	Milsom Rend. & Fert. Co., E. Buffalo, N. Y.	9.76	0.97	0.14	10.87	4.79	5.83	36.44	1956
1957	Potato, Hop and Tobacco Phosphate.....	Milsom Rend. & Fert. Co., E. Buffalo, N. Y.	8.42	1.06	0.12	9.59	2.79	4.75	27.88	1957
1958	Corn and Wheat Grower.....	J. & F. Schroth Pack Co., Cincinnati, O.	3.23	5.49	4.71	13.53	4.66	4.76	33.92	1958
1959	Schroth's Special.....	J. & F. Schroth Pack Co., Cincinnati, O.	4.52	3.54	3.89	11.95	2.44	1.35	21.79	1959
1972	Quaker City Fertilizer.....	Thomas Mertz, Richmond, Ind.	9.44	4.25	5.19	19.44	3.92	0.27	13.69	1972
1981	Bone Meal.....	Akin Fertilizer Co., Evansville, Ind.	8.20	3.68	3.90	15.77	2.26	3.20	23.88	1981
1982	Bone Meal and Potash.....	Champion Fertilizer Co., Cleveland, Ohio...	0.00	2.51	14.79	17.30	2.34	2.78	22.47	1982

1385 Soft Bone	Charles E. St. John, Greensburg, Ind.....	0.00	5.09	4.17	9.26	3.40	0.00	16.68	1986
1391 Pure Raw Bone	J. B. Jones, Louisville, Ky.....	0.00	5.79	15.04	20.83	5.15	0.00	30.03	1991
1392 Ammoniated Bone Meal	J. B. Jones, Louisville, Ky.....	0.00	6.84	6.50	13.34	3.73	0.00	20.53	1992
1395 Acid Phosphate and Potash	S. Kaufman & Sons, Indianapolis, Ind.....	6.68	3.49	0.52	10.69	0.00	1.90	16.72	1995
1397 Pure Raw Bone	The Farmer's Fert. Co., Indianapolis, Ind.....	0.00	8.62	14.94	23.56	5.08	0.00	31.73	1997
2000 Thompson & Edwards Dis. Bone Meal.....	Thompson & Edwards, Chicago, Ill.....	5.44	2.45	4.48	12.37	1.63	0.26	18.04	2000
2001 Thompson & Edwards Pack. H'se B.M.....	Thompson & Edwards, Chicago, Ill.....	0.00	4.25	7.79	12.04	3.09	1.27	19.22	2001
2002 Thompson & Edwards Fine Gr'd B. M.....	Thompson & Edwards, Chicago, Ill.....	0.00	4.96	9.12	13.98	2.89	0.81	19.43	2002
2003 Hubbard's Soluble Bone and Potash.....	Hubbard & Company, Baltimore, Md.....	9.86	3.61	0.31	13.68	0.00	0.71	22.09	2003
2004 Pure Raw Bone Meal.....	Walker Stratman & Co., Pittsburg, Pa.....	0.00	9.01	14.89	23.90	4.50	0.00	30.23	2004
2006 Ox Brand Alkaline Bone.....	Tennessee Chemical Co., Nashville, Tenn.....	8.43	4.86	1.13	14.42	0.00	2.27	21.78	2006
2007 Dissolved Bone.....	Western Union Chemical Co., Cleveland, O.....	8.62	4.30	1.15	14.07	0.00	5.65	25.33	2007
2008 Banner Crop Grower.....	S. Kaufman & Sons, Indianapolis, Ind.....	2.44	5.50	4.17	12.11	1.32	0.59	17.45	2008
2009 Bone Meal and Potash.....	South, Indiana Fert. Co., Boonville, Ind.....	3.57	5.67	10.27	19.51	2.66	4.37	30.27	2009
2010 Soluble Bone and Potash.....	South, Indiana Fert. Co., Boonville, Ind.....	7.42	3.58	4.13	15.43	2.05	3.12	27.37	2010
2011 Ground Bone	Schmadel Company, Evansville, Ind.....	0.00	6.83	12.65	19.48	4.82	0.00	28.10	2011
2012 Wayne Brand Superphosphate.....	Bash Packing Co., Fort Wayne, Ind.....	4.86	4.37	4.64	13.87	5.42	2.30	33.80	2012
2013 Bradley's Fine Ground Bone.....	Bradley Fertilizer Co., Boston, Mass.....	0.00	7.19	15.86	23.05	3.76	0.00	27.42	2013
2014 Lister's Animal Bone and Potash.....	Lister's Agr. Chem. Works, Newark, N. J.....	7.06	3.00	0.88	10.94	0.00	4.72	20.10	2014
2015 Old Times Raw Bone Meal.....	A. Hopkins & Co., New Albany, Ind.....	0.00	7.58	14.81	22.39	3.90	0.00	27.37	2015
2016 Bone Meal	The Jones Fertilizing Co., Cincinnati, O.....	4.58	5.34	8.26	18.18	3.69	0.00	28.26	2016
2017 Ammoniated Bone Meal	The Jones Fertilizing Co., Cincinnati, O.....	0.60	5.58	8.65	14.83	5.07	0.00	27.32	2017
2018 Acidulated Bone	The Jones Fertilizing Co., Cincinnati, O.....	5.59	3.49	6.03	15.11	4.42	0.00	28.38	2018
2019 Acid Phosphate	The Jones Fertilizing Co., Cincinnati, O.....	5.73	2.94	0.86	9.53	0.00	0.00	10.30	2019
2020 Bone and Potash	The Jones Fertilizing Co., Cincinnati, O.....	5.25	2.12	2.85	10.22	1.96	4.24	22.43	2020
2021 Tobacco and Potato Grower.....	The Jones Fertilizing Co., Cincinnati, O.....	3.76	3.55	5.67	12.98	4.59	6.54	34.12	2021
2022 Miami Valley Phosphate.....	The Jones Fertilizing Co., Cincinnati, O.....	6.47	3.03	4.09	13.59	3.20	3.37	28.58	2022
2023 Jewel Phosphate.....	The Jones Fertilizing Co., Cincinnati, O.....	6.01	3.01	1.73	10.75	0.74	0.00	15.54	2023
2024 Jones' Reliable	The Jones Fertilizing Co., Cincinnati, O.....	5.59	2.47	2.58	10.64	1.54	1.81	16.11	2024
2023 Acid Phosphate	Emery J. Smith & Co., Columbus, O.....	6.92	3.19	4.22	14.33	0.00	0.00	12.13	2023
2034 Acidulated Bone	Emery J. Smith & Co., Columbus, O.....	0.00	3.69	13.13	16.82	1.32	0.00	15.73	2034
2036 Ammoniated Bone and Potash.....	Emery J. Smith & Co., Columbus, O.....	4.82	4.76	13.24	22.81	1.62	2.42	26.46	2036
2037 Chicago Bone Meal.....	Chicago Fertilizer Co., Chicago, Ill.....	0.00	8.44	21.59	30.43	2.43	0.00	28.59	2037
2038 No. 1 Acid Phosphate.....	Chicago Fertilizer Co., Chicago, Ill.....	11.76	6.06	0.64	18.46	0.00	0.00	21.37	2038
2039 No. 2 Acid Phosphate.....	Chicago Fertilizer Co., Chicago, Ill.....	6.65	2.78	4.26	13.69	0.00	0.00	11.32	2039
2042 Old Times Phosphate.....	A. Hopkins & Co., New Albany, Ind.....	6.81	3.00	1.64	11.46	1.81	2.36	22.65	2042
2043 Half and Half	A. Hopkins & Co., New Albany, Ind.....	3.17	6.09	6.88	16.14	3.05	1.91	27.19	2043
2044 Corn and Wheat Grower.....	A. Hopkins & Co., New Albany, Ind.....	3.04	5.61	7.20	15.76	3.62	1.79	26.06	2044
2046 Pride of Georgetown Phosphate.....	A. Hopkins & Co., New Albany, Ind.....	8.20	3.16	0.99	12.85	1.19	1.63	21.83	2046
2046 Fine Ground Bone Meal.....	Ohio Farmers' Fertilizer Co., Columbus, O.....	0.79	7.17	15.53	23.49	2.60	0.00	25.16	2046

TABLE OF FERTILIZERS—Continued.

NAME OF FERTILIZERS.		MANUFACTURERS.										Relative Value per Ton.		Number.
Number.		Per Cent. Soluble Phosphoric Acid.	Per Cent. Reverted Phosphoric Acid.	Per Cent. Insoluble Phosphoric Acid.	Per Cent. Total Phosphoric Acid.	Per Cent. of Ammonia.	Per Cent. of Potash.							
2047	Acid Phosphate	6.93	3.03	4.20	14.16	0.00	0.00	0.00	11.95	2047				
2048	Superior Phosphate	11.65	6.18	0.64	18.47	0.00	0.00	0.00	21.40	2048				
2049	Soluble Bone and Potash	7.55	3.95	5.26	16.76	0.00	1.40	0.00	19.88	2049				
2050	Horse Shoe Br'd Fine Raw Bone	0.00	6.42	16.57	22.99	5.07	0.00	0.00	31.80	2050				
2051	Horse Shoe Br'd Pure Ground Bone	0.00	7.56	10.76	18.32	3.63	0.00	0.00	23.86	2051				
2052	Horse Shoe Br'd Acidulated Bone	5.95	4.20	3.72	13.87	1.84	0.00	0.00	21.22	2052				
2053	Horse Shoe Br'd Quick Acting Phos.	6.55	5.02	1.34	12.91	0.00	0.00	0.00	13.88	2053				
2054	Horse Shoe Br'd Acidulated B. & Pot.	6.19	4.00	3.13	13.32	1.84	1.02	0.00	22.26	2054				
2055	Horse Shoe Br'd Nutritional Bone Dust ..	4.59	4.42	2.34	11.35	2.85	0.64	0.00	22.87	2055				
2056	Horse Shoe Br'd Garden City Superph.	4.75	3.73	2.47	11.00	2.84	0.71	0.00	22.80	2056				
2057	Horse Shoe Br'd Challenge C'n Grower	4.63	4.04	2.46	11.13	2.81	0.64	0.00	22.32	2057				
2058	Horse Shoe Br'd R.B.&Superphos.Mixt.	4.39	5.60	6.74	16.73	3.33	0.59	0.00	27.53	2058				
2059	Horse Shoe Br'd Prairie Phosphate	4.35	2.38	2.12	8.85	2.53	0.53	0.00	18.60	2059				
2060	Horse Shoe Br'd Ky-Ana Phosphate	4.13	2.62	2.05	8.80	2.51	0.46	0.00	15.35	2060				
2061	Bone and Potash	6.52	4.33	3.44	14.29	0.00	1.01	0.00	17.73	2061				
2062	Horse Shoe Br'd Corn & Wh. Grower	5.71	4.89	3.10	13.70	2.79	1.04	0.00	26.70	2062				
2063	Horse Shoe Br'd Dis. B. Phosphate	7.57	3.91	2.84	14.32	1.82	0.00	0.00	22.67	2063				
2064	Golden Harvest Bone Meal	8.06	2.25	1.84	12.15	3.64	0.00	0.00	26.09	2064				
2065	Big 4 Phosphate	7.66	1.43	3.48	12.56	1.47	0.00	0.00	21.94	2065				
2066	Phosphate of Potash	9.57	1.56	1.62	12.76	0.00	4.76	0.00	21.94	2066				
2067	Globe Bone Dust	7.89	2.31	5.80	16.00	2.08	1.03	0.00	24.06	2067				
2068	Eagle Wheat and Corn Grower	8.32	2.06	1.97	12.35	2.71	3.13	0.00	27.21	2068				
2069	Progress Corn and Wheat Grower	8.09	2.49	1.98	12.56	2.64	1.12	0.00	24.87	2069				
2070	Bone and Potash	9.59	4.22	1.54	16.85	0.62	1.63	0.00	23.47	2070				
2071	Globe Wheat Grower	8.43	1.93	1.83	12.13	2.73	8.11	0.00	27.14	2071				

2074 Special Bone and Potash Mixture.....	5.03	3.07	2.17	10.27	1.24	4.71	21.58	2074
2075 Desiccated Bone	0.00	9.43	22.76	32.13	2.04	0.00	23.65	2075
2076 Acid Phosphate	1.09	12.96	16.98	10.59	0.00	0.00	16.86	2076
2077 Homestead Corn and Wheat Grower...	7.91	1.73	0.96	10.59	2.86	2.36	25.29	2077
2078 Red Line Complete Manure.....	4.54	4.17	1.47	10.13	1.74	1.57	20.01	2078
2079 Red Line Crop Grower.....	5.67	2.75	1.62	10.04	2.22	2.41	21.99	2079
2080 Bradley's Abattoir Bone Dust.....	1.73	7.60	6.87	16.20	2.13	0.00	23.10	2080
2081 Bradley's Acid Phosphate.....	10.49	5.06	0.99	16.54	0.00	0.00	18.06	2081
2082 Bradley's Dissolved Bone Justice Brd.	10.30	6.13	1.11	16.59	0.00	0.00	18.53	2082
2083 Bradley's Alkaline Bone with Potash.	7.88	3.68	0.81	12.37	0.00	2.42	19.41	2083
2084 Triangle Br'd Ex. F. Gr'd Bo. with Pot.	0.58	3.39	7.88	11.85	1.78	1.12	15.33	2084
2085 Bradley's Niagara Phosphate.....	6.24	3.12	1.64	11.00	1.13	1.56	19.02	2085
2086 Bradley's B. D. Sea Fowl Guano.....	5.97	3.62	2.26	11.85	2.09	4.76	28.11	2086
2087 Bradley's Dissolved Bone with Potash.	6.10	3.28	2.29	11.67	2.56	2.06	24.19	2087
2088 Bradley's Potato and Root Phosphate.	5.73	3.27	2.12	11.12	1.56	3.98	23.80	2088
2089 Cumberland Extra Fine Ground Bone.	1.75	6.90	7.16	15.81	2.36	0.00	22.05	2089
2090 Cumberland Dissolved Bone Phosphate.	10.38	5.31	0.95	16.64	0.00	0.00	18.83	2090
2091 Cumberland Bone and Potash.....	7.77	3.65	0.90	12.82	0.00	2.59	19.46	2091
2092 Cumberland Potato Phosphate.....	5.80	3.99	2.14	10.33	1.86	4.08	23.64	2092
2093 Cumberland Hawkeye Fertilizer.....	5.30	2.60	1.50	9.40	1.08	1.50	16.70	2093
2094 Cumberland Guano	6.17	3.49	2.11	11.77	2.55	2.45	24.96	2094
2095 Cumberland Am. Dissolved Bone.....	6.03	3.57	2.14	11.74	2.51	4.72	27.49	2095
2096 W. & C. Carter's Ground Bone.....	2.05	6.07	7.64	15.76	2.34	0.00	21.14	2096
2097 Williams & Clark Dissolved B. Phos.	11.32	3.75	1.25	16.32	0.00	0.00	18.08	2097
2098 Acorn Brand Acid Phosphate.....	10.48	4.89	1.07	16.44	0.00	0.00	18.44	2098
2099 American Dissolved Bone and Potash.	7.61	4.02	0.83	12.46	0.00	2.52	19.64	2099
2100 Royal Bone Phosphate	6.08	3.62	2.07	11.77	2.47	2.11	24.55	2100
2101 Prolific Crop Product.....	5.83	2.60	1.54	8.47	1.18	1.46	16.71	2101
2102 Good Grower Potato Phosphate	5.66	2.88	2.06	10.68	1.82	3.43	23.08	2102
2103 Uncas Bone Meal	1.73	6.44	7.65	15.82	2.29	0.00	21.37	2103
2104 Soluble Dissolved Bone	10.34	5.94	1.13	16.81	0.00	0.00	18.76	2104
2105 Plain Superphosphate	10.17	5.05	1.27	16.49	0.00	0.00	18.26	2105
2106 Dissolved Bone and Potash.....	6.33	3.79	2.12	12.24	2.71	4.77	28.87	2106
2107 Climax Phosphate	6.15	3.85	2.01	12.01	2.56	2.01	24.87	2107
2108 Mohawk Fertilizer	6.03	3.46	1.48	10.96	1.13	1.62	19.20	2108
2109 Extra Fine Ground Bone	1.85	6.47	7.80	16.12	2.40	0.00	21.07	2109
2110 Standard Dissolved Bone Phosphate.	10.66	5.42	0.83	16.91	0.00	0.00	19.30	2110
2111 Standard Am. Dissolved Bone.....	6.33	3.84	2.06	12.22	2.67	4.89	28.94	2111
2112 Standard Guano For All Crops.....	6.22	3.68	1.94	11.74	2.49	2.16	24.65	2112
2113 Standard Bone and Potash.....	7.61	4.07	0.72	12.40	0.00	2.39	19.51	2113

TABLE OF FERTILIZERS—Continued.

Number.	NAME OF FERTILIZERS.	MANUFACTURERS.							Relative Value per Ton.	Number.
		Per Cent. Soluble Phosphoric Acid.	Per Cent. Reverted Phosphoric Acid.	Per Cent. Insoluble Phosphoric Acid.	Per Cent. Total Phosphoric Acid.	Per Cent. of Ammonia.	Per Cent. of Potash.			
2114	Standard A Brand	5.45	2.80	1.47	9.72	1.08	1.44	17.11	2114	
2115	Standard Potato Special	3.32	3.23	2.00	11.20	1.93	3.88	23.96	2115	
2116	Horse Shoe Brand Melon Grower.....	6.20	2.74	1.77	10.71	4.16	3.37	29.75	2116	
2117	Darling's Ground Raw Bone.....	0.00	6.97	16.86	23.83	4.83	0.00	31.17	2117	
2118	Darling's Pure Ground Bone.....	0.00	8.76	16.81	25.57	3.29	0.00	27.77	2118	
2119	Darling's Sure Winner Brand.....	1.74	7.24	5.95	14.93	2.64	3.76	27.38	2119	
2120	Darling's Farmer's Favorite Brand.....	7.84	2.70	2.79	13.33	3.77	4.64	32.75	2120	
2121	Darling's Chicago Brand.....	2.03	8.34	4.41	14.78	3.80	1.68	29.58	2121	
2122	Darling's Vegetable Grower Brand.....	5.65	2.41	2.40	10.46	4.41	7.13	31.03	2122	
2123	Ox High Grade Dissolved Bone.....	13.65	2.58	0.15	16.38	0.00	0.00	19.48	2123	
2124	Ox Bone and Potash.....	8.12	5.19	0.46	13.77	0.00	1.60	20.74	2124	
2125	Ox Special Wheat and Corn Guano.....	10.23	3.92	0.91	15.06	1.35	1.34	25.83	2125	
2126	Ox Ammoniated Bone.....	8.94	3.44	1.39	13.77	2.14	2.49	27.30	2126	
2127	Ox Bone with Ammonia and Potash.....	8.49	3.46	1.07	13.02	1.39	1.48	23.10	2127	
2128	High Grade Acid Phosphate	12.84	3.02	2.51	18.37	0.00	0.00	19.03	2128	
2129	Ground Bone	0.00	7.82	17.97	25.79	3.60	0.00	28.85	2129	
2131	Special Compound	5.04	2.29	1.89	9.72	0.96	4.83	20.39	2131	
2132	Wheat and Grass Manure	5.50	2.29	1.93	9.72	0.98	4.63	20.17	2132	
2133	Ammoniated Bone Superphosphate	8.11	2.48	1.29	11.88	2.27	3.40	26.23	2133	
2134	Keystone Bone Phosphate	8.47	2.45	1.30	12.22	1.81	2.77	24.56	2134	
2135	Special Corn Manure	2.47	5.02	2.14	9.63	1.00	4.79	20.09	2135	
2136	Boar's Head Brand Chicago Bone Meal.....	0.00	8.47	12.73	21.20	4.20	0.00	27.44	2136	
2137	Boar's Head Br'd World of G. Super.....	4.23	4.43	3.84	12.50	2.72	1.33	23.42	2137	
2138	Boar's Head Br'd Am. B. & Pot.....	6.27	3.51	4.16	13.94	0.95	1.17	19.61	2138	
2139	Boar's Head Br'd Soluble Phosphate.....	8.20	3.87	2.97	15.04	0.00	0.00	14.48	2139	

Packer's Fert. Association, Chicago, Ill.	6.24	4.08	2.60	12.92	1.04	0.00	18.61	2140
Jas. McCallum & Co., Dayton, O.	11.53	3.35	1.00	15.88	0.95	0.00	24.08	2141
Jas. McCallum & Co., Dayton, O.	6.46	3.72	0.17	10.35	0.00	0.65	15.10	2142
Jas. McCallum & Co., Dayton, O.	8.21	2.76	2.87	13.84	2.40	3.34	21.71	2143
Jas. McCallum & Co., Dayton, O.	10.30	3.21	1.64	15.15	1.73	1.09	26.07	2144
Jas. McCallum & Co., Dayton, O.	0.00	4.48	13.94	18.32	3.85	1.54	26.22	2145
Jas. McCallum & Co., Dayton, O.	4.35	3.96	6.93	15.24	3.32	2.90	24.74	2146
Jas. McCallum & Co., Dayton, O.	8.70	1.68	0.49	10.87	3.32	4.53	30.12	2147
Star Tank. & Fert. Wks., Mt. Carmel, Ill.	0.00	8.00	16.64	24.84	3.61	0.00	28.01	2148
Star Tank. & Fert. Wks., Mt. Carmel, Ill.	6.78	4.01	7.30	18.09	2.81	0.00	26.46	2149
Star Tank. & Fert. Wks., Mt. Carmel, Ill.	7.00	3.48	5.37	15.85	3.28	2.44	29.59	2150
Swift & Co., Chicago, Ill.	0.00	5.68	19.75	25.43	4.95	0.00	32.65	2151
Swift & Co., Chicago, Ill.	0.00	8.47	19.60	32.28	0.00	0.07	29.49	2152
Swift & Co., Chicago, Ill.	18.71	4.90	1.33	19.94	0.00	0.00	22.33	2153
Swift & Co., Chicago, Ill.	8.15	3.33	1.15	12.63	0.00	0.00	13.78	2154
Swift & Co., Chicago, Ill.	6.77	2.52	3.61	12.90	1.75	1.55	21.56	2155
Swift & Co., Chicago, Ill.	3.13	3.63	6.23	15.93	3.75	2.72	30.67	2156
Swift & Co., Chicago, Ill.	8.67	3.79	1.07	13.53	0.00	2.44	20.80	2157
S. Kaufman & Sons, Indianapolis, Ind.	7.47	3.22	4.73	15.42	2.67	4.89	30.74	2158
Thompson & Edwards, Chicago, Ill.	0.00	4.62	9.67	14.29	1.81	1.41	17.13	2159
The Jarecki Chemical Co., Sandusky, O.	11.07	4.04	1.05	16.17	0.00	4.46	26.93	2163
The Jarecki Chemical Co., Sandusky, O.	9.02	2.74	1.54	13.50	0.00	0.46	20.34	2165
The Jarecki Chemical Co., Sandusky, O.	8.06	2.68	1.14	11.88	1.60	2.15	22.87	2166
The Jarecki Chemical Co., Sandusky, O.	3.77	2.48	1.23	7.48	0.35	0.81	11.26	2167
The Jarecki Chemical Co., Sandusky, O.	7.64	2.56	1.18	12.38	1.36	6.36	26.65	2168
The Currie Fertilizer Co., Louisville, Ky.	12.35	2.38	2.85	17.58	0.00	0.00	17.68	2171
The Currie Fertilizer Co., Louisville, Ky.	6.01	1.41	2.35	9.77	1.85	4.09	21.79	2172
The Currie Fertilizer Co., Louisville, Ky.	8.30	2.23	2.87	12.97	1.85	2.29	23.94	2173
The Currie Fertilizer Co., Louisville, Ky.	8.48	2.33	2.32	13.13	1.64	1.26	24.49	2174
The Currie Fertilizer Co., Louisville, Ky.	9.44	2.64	2.70	14.78	1.08	2.29	23.98	2175
The Loudenback Fertilizer Co., Urbana, O.	6.03	3.16	2.84	12.03	2.50	3.61	25.83	2177
The Loudenback Fertilizer Co., Urbana, O.	6.58	3.05	3.24	12.87	2.73	4.71	28.62	2178
The Loudenback Fertilizer Co., Urbana, O.	7.32	4.28	2.34	13.94	0.00	2.77	22.50	2179
Clasman Fertilizer Co., Cleveland, O.	5.19	4.43	3.81	13.43	0.00	0.00	11.51	2180
Rasin Monumental Co., Baltimore, Md.	12.19	3.91	0.35	16.45	0.00	0.00	19.32	2181
Rasin Monumental Co., Baltimore, Md.	4.34	6.20	1.22	11.76	0.00	0.00	12.65	2182
Rasin Monumental Co., Baltimore, Md.	6.56	2.46	2.94	11.86	2.97	0.00	22.67	2183
Rasin Monumental Co., Baltimore, Md.	12.08	3.22	0.35	15.65	0.00	2.47	24.52	2184
Rasin Monumental Co., Baltimore, Md.	7.87	2.13	0.53	10.58	2.85	2.37	26.35	2185
Rasin Monumental Co., Baltimore, Md.	6.17	2.94	0.86	9.99	1.01	2.32	18.91	2186

TABLE OF FERTILIZERS—Continued.

Number.	NAME OF FERTILIZERS.	MANUFACTURERS.										Per Cent. Soluble Phosphoric Acid.	Per Cent. Reverted Phosphoric Acid.	Per Cent. Insoluble Phosphoric Acid.	Per Cent. Total Phosphoric Acid.	Per Cent. of Ammonia.	Per Cent. of Potash.	Relative Value per Ton.	Number.
2187	Ammoniated Alkaline Phosphate	Rasin Monumental Co., Baltimore, Md.										7.71	2.64	1.20	11.55	1.89	2.24	23.33	2187
2188	Broad Ax Fertilizer	St. Louis Sanitary Co., St. Louis, Mo.										1.19	2.59	2.10	6.28	3.88	0.46	13.72	2188
2189	Dater Fertilizer	St. Louis Sanitary Co., St. Louis, Mo.										3.59	2.84	0.12	10.56	2.80	1.06	13.41	2189
2190	Crocker's Dissolved Bone Phosphate	Crocker Fert. & Chem. Co., Buffalo, N. Y.										12.85	3.49	0.69	17.13	0.00	0.00	19.73	2190
2191	Crocker's Dissolved Bone and Potash	Crocker Fert. & Chem. Co., Buffalo, N. Y.										2.53	5.50	1.54	9.57	0.00	2.91	15.35	2191
2192	Wayne Brand Pure Raw Ground Bone.	Bash Packing Co., Fort Wayne, Ind.										0.00	6.60	14.84	21.44	4.94	0.00	29.83	2192
2193	Bone Meal	Fripp Bros., North Vernon, Ind.										1.02	7.23	14.60	22.86	4.21	0.00	30.03	2193
2194	Ammoniated Bone Meal	Fripp Bros., North Vernon, Ind.										0.64	4.94	9.40	14.38	4.90	0.00	26.27	2194
2195	Acidulated Bone Meal	Fripp Bros., North Vernon, Ind.										5.46	3.69	6.36	15.51	4.34	0.00	28.37	2195
2196	Diamond Phosphate	Fripp Bros., North Vernon, Ind.										3.86	2.21	2.10	8.17	1.49	0.00	13.81	2196
2197	Soluble Phosphate	Fripp Bros., North Vernon, Ind.										5.83	3.01	1.32	10.21	0.00	0.00	10.67	2197
2198	Hoosier Phosphate	Fripp Bros., North Vernon, Ind.										3.11	1.57	2.65	7.33	2.06	2.66	16.95	2198
2199	Bone Phosphate	Fripp Bros., North Vernon, Ind.										3.24	2.74	2.46	8.44	3.38	6.76	27.61	2199
2200	Bone and Potash	Fripp Bros., North Vernon, Ind.										3.91	3.22	5.87	13.00	4.50	6.62	33.77	2200
2201	Bone Meal	The Cincinnati Fert. Co., Cincinnati, O.										1.63	6.93	13.92	22.53	3.99	0.00	29.59	2201
2202	Ammoniated Bone Meal	The Cincinnati Fert. Co., Cincinnati, O.										0.77	4.66	9.08	14.51	5.00	0.00	26.23	2202
2203	Acidulated Bone Meal	The Cincinnati Fert. Co., Cincinnati, O.										5.65	3.37	6.47	15.49	4.48	0.00	28.66	2203
2204	Star Phosphate	The Cincinnati Fert. Co., Cincinnati, O.										4.27	4.25	1.66	10.17	0.00	0.00	10.22	2204
2205	Pearl Phosphate	The Cincinnati Fert. Co., Cincinnati, O.										4.85	2.42	1.97	9.24	1.10	0.00	14.27	2205
2206	Queen City Phosphate	The Cincinnati Fert. Co., Cincinnati, O.										3.94	2.70	3.17	9.71	3.12	5.96	26.94	2206
2207	Indiana Phosphate	The Cincinnati Fert. Co., Cincinnati, O.										2.11	1.83	2.33	6.27	2.18	2.86	16.42	2207
2208	Wheat Grower	S. A. Green, Lovett, Ind.										1.32	2.22	1.98	5.52	3.13	6.49	22.93	2208
2209	Bone Meal	John W. Allen, Scottsborough, Ind.										0.05	6.42	12.51	17.98	3.43	0.00	23.95	2209
2210	Ammoniated Bone	John W. Allen, Scottsborough, Ind.										4.71	4.29	6.43	15.43	4.64	0.00	29.07	2210
2211	Sure Crop	John W. Allen, Scottsborough, Ind.										1.14	4.41	2.47	8.03	1.87	1.63	16.32	2211

2212 Complete Fertilizer	John W. Allen, Scottsburgh, Ind.	1.94	2.43	3.01	7.33	3.32	4.63	22.90	2212
2213 Farmer's Choice	C. F. Lurton & Son, Commissary, Ind.	1.24	3.71	3.51	8.46	2.22	2.31	17.77	2213
2214 Valley City Corn Grower	Madison Fert. & Glue Wks., Madison, Ind.	7.92	4.38	1.93	14.23	2.45	1.02	26.57	2214
2215 Corn Grower	Louisville Fert. Works, Louisville, Ky.	1.41	9.67	1.34	12.42	0.00	3.32	20.03	2215
2216 C. O. D. Phosphate	The Jarecki Chemical Co., Sandusky, O.	12.67	2.14	1.57	16.38	0.00	0.00	17.77	2216
2217 Dissolved Bone Black Wheat Special	The Jarecki Chemical Co., Sandusky, O.	14.00	2.05	1.60	17.65	0.00	0.00	19.26	2217
2218 Lake Erie Fish Guano	The Jarecki Chemical Co., Sandusky, O.	5.12	3.10	3.73	11.95	1.84	2.17	21.12	2218
2221 Bowker's Soluble Bone	Bowker Fertilizer Co., Boston, Mass.	10.39	4.08	1.93	16.40	0.00	0.00	17.36	2221
2224 Big One Pure Raw Bone	Nelson Morris & Co., Chicago, Ill.	0.00	6.33	19.10	25.43	4.63	0.00	81.84	2224
2225 Big Two Pure Bone Meal	Nelson Morris & Co., Chicago, Ill.	1.13	8.40	18.41	27.94	2.50	0.00	28.21	2225
2226 Big Three Bone Phosphate	Nelson Morris & Co., Chicago, Ill.	1.09	3.96	6.27	11.32	3.96	1.85	30.68	2226
2227 Big Four Bone Phosphate	Nelson Morris & Co., Chicago, Ill.	3.04	3.42	8.57	15.03	4.76	3.15	30.53	2227
2228 Big Five Bone Phosphate	Nelson Morris & Co., Chicago, Ill.	0.84	3.04	10.99	14.87	2.75	0.49	18.67	2228
2229 Indian Brand Phoenix Phosphate	Geo. S. Bartlett, Cincinnati, O.	2.97	3.62	1.34	7.83	2.33	0.88	17.67	2229
2230 Soluble Bone and Potash	Louisville Fert. Works, Louisville, Ky.	1.80	8.49	1.19	11.48	1.23	2.23	21.31	2230
2232 Bone Meal	Rasin Monumental Co., Baltimore, Md.	0.62	10.32	12.35	23.29	3.75	0.00	31.51	2232
2233 Wheat Grower	J. B. Jones, Louisville, Ky.	4.67	3.90	2.48	11.05	2.04	1.94	21.44	2233
2234 R. B. Guano	Milsom Reid, & Fert. Co., E. Buffalo, N. Y.	2.17	1.56	2.21	5.94	2.21	1.53	14.63	2234
2235 Genuine Wheat Grower	Robert Baughack, Shelbyville, Ind.	5.32	5.58	7.27	13.17	2.91	0.00	26.90	2235
2236 Grower (Number 1) One	Peter Backer & Son, Troy, Ind.	5.69	4.09	5.19	14.67	4.05	0.00	27.92	2236
2237 Grower Number Two	Peter Backer & Son, Troy, Ind.	5.68	2.78	4.61	13.07	3.88	4.65	30.91	2237
2238 Grower No. 3 Tob., Pot. & Tomato	Peter Backer & Son, Troy, Ind.	4.38	3.61	5.85	13.84	4.16	2.13	28.55	2238
2239 Grower No. 7 R. B. Tank & Potash	Peter Backer & Son, Troy, Ind.	0.00	5.10	7.69	12.79	5.66	4.32	31.12	2239
2240 Grower No. 8 Row B. & Tankage	Peter Backer & Son, Troy, Ind.	0.00	7.13	11.13	18.26	5.25	0.00	28.83	2240
2241 Grower No. 9 Pure Raw Bone Meal	Peter Backer & Son, Troy, Ind.	0.00	7.63	14.66	22.29	4.72	0.00	29.76	2241
2242 Superior Bone	The Cleveland Dryer Co., Cleveland, O.	0.74	8.21	13.74	23.69	4.13	0.00	33.16	2242
2243 Swine Bone	The Cleveland Dryer Co., Cleveland, O.	2.73	7.93	8.23	19.06	2.42	0.00	27.31	2243
2244 XXX Phosphate	The Cleveland Dryer Co., Cleveland, O.	3.81	4.77	0.62	14.20	0.00	0.00	15.94	2244
2245 Horsehead Phosphate	The Cleveland Dryer Co., Cleveland, O.	6.46	3.58	0.12	10.76	0.00	0.00	12.06	2245
2246 Ohio Seed Maker	The Cleveland Dryer Co., Cleveland, O.	5.14	5.02	3.53	13.69	2.05	0.00	22.49	2246
2247 Phospho Bone	The Cleveland Dryer Co., Cleveland, O.	6.19	3.16	1.74	11.09	1.09	1.19	18.83	2247
2248 Buckeye Ammoniated Bone Superphos.	The Cleveland Dryer Co., Cleveland, O.	6.20	2.72	3.21	12.13	3.20	1.05	25.27	2248
2249 Ohio Seed Maker with Potash	The Cleveland Dryer Co., Cleveland, O.	5.81	3.74	4.22	13.77	1.89	2.37	24.42	2249
2250 Potato, Tobacco and Gen'l Crop Fert.	The Cleveland Dryer Co., Cleveland, O.	5.55	3.60	2.80	11.95	1.33	6.21	25.95	2250
2251 Ammoniated Bone and Phosphate	White River B. M. & Fert. Co., Seymour, Ind.	0.00	3.63	20.09	23.72	2.31	2.01	26.93	2251
2252 Hoosier Corn and Wheat Grower	Marengo Mfg. Co., Marengo, Ind.	10.02	3.68	1.05	14.75	0.93	0.41	23.09	2252
2253 Bowker's Am. Food for Flowers	Bowker Fertilizer Co., Boston, Mass.	0.25	6.28	6.64	13.18	3.50	4.75	26.31	2253
2254 Walker's "Excelsior Br'd" Sol. Food	Flower City Plant Food Co., Rochester, N. Y.	0.00	6.64	8.69	15.33	6.53	10.19	42.55	2254
2255 Joseph Lister's Pure Bone Meal	Joseph Lister, Chicago, Ill.	0.00	8.22	17.31	25.53	3.70	0.00	28.97	2255
2256 Urbana Acidulated Bone	The Loudonback Fertilizer Co., Urbana, O.	8.88	3.90	3.33	16.11	0.00	0.00	15.34	2256

TABLE OF FERTILIZERS—Continued.

Number.	NAME OF FERTILIZERS.	MANUFACTURERS.	Per Cent. Soluble	Per Cent. Reverted	Per Cent. Insoluble	Per Cent. Total	Per Cent. of Ammonia.	Per Cent. of Potash.	Relative Value per Ton.	Number.
			Phosphoric Acid.	Phosphoric Acid.	Phosphoric Acid.	Phosphoric Acid.	Phosphoric Acid.	Phosphoric Acid.		
2257	Urbana Acidulated Bone and Potash....	The Loudenback Fertilizer Co., Urbana, O.	7.75	5.53	3.04	14.33	0.00	0.87	18.71	2257
2258	Urbana Bone Phosphate and Potash....	The Loudenback Fertilizer Co., Urbana, O.	5.35	3.86	2.78	12.00	1.44	1.05	20.16	2258
2259	Urbana Sweepstakes Bone.....	The Loudenback Fertilizer Co., Urbana, O.	5.27	3.33	2.61	11.21	2.40	2.05	23.27	2259
2260	Soft Bone and Potash.....	Charles E. St. John, Greensburg, Ind.	1.46	6.66	7.23	14.75	2.23	0.63	22.31	2260
2261	World of Good Wheat & Corn Grower.....	Thompson & Edwards, Chicago, Ill.	3.67	3.84	6.00	13.51	2.78	1.04	23.70	2261
2262	Empire Raw Bone Meal.....	Empire Carbon Works, St. Louis, Mo.	0.00	8.13	14.91	23.04	4.13	0.00	23.52	2262
2263	Waukesha Bone.....	Champion Fertilizer Co., Cleveland, O.	14.27	2.80	1.19	18.20	0.00	0.00	20.41	2263
2264	Western Reserve Dissolved Bone.....	Champion Fertilizer Co., Cleveland, O.	6.24	2.89	1.69	10.72	1.08	2.41	19.87	2264
2265	Ammoniated Soluble Bone.....	Champion Fertilizer Co., Cleveland, O.	6.27	2.92	1.69	10.92	1.08	1.23	18.59	2265
2266	Special Dissolved Bone Phosphate.....	Walton Fertilizer Co., Cleveland, O.	9.62	2.35	0.90	12.87	0.00	0.00	14.35	2266
2267	Diamond Cerealo Soluble Bone.....	Walton Fertilizer Co., Cleveland, O.	12.03	2.69	0.87	15.59	0.64	0.00	23.05	2267
2268	Pure Bone with Potash.....	Walton Fertilizer Co., Cleveland, O.	0.00	2.87	3.52	12.49	1.89	1.59	16.32	2268
2269	Diamond Bone Black and Potash.....	Walton Fertilizer Co., Cleveland, O.	9.26	3.68	0.77	13.71	0.00	2.29	21.33	2269
2270	Ontario Fish Guano and Potash.....	Walton Fertilizer Co., Cleveland, O.	4.67	4.24	1.30	10.21	2.14	1.31	21.23	2270
2271	Wheat and Grass Grower.....	Walton Fertilizer Co., Cleveland, O.	3.66	5.32	1.33	10.36	1.23	0.97	19.09	2271
2272	Indiana Special.....	Ohio Farmers' Fert. Co., Columbus, O.	6.45	4.08	3.16	13.69	0.00	1.53	18.47	2272
2273	Corn, Oats and Wheat Fish Guano.....	Ohio Farmers' Fert. Co., Columbus, O.	4.94	3.66	3.97	12.47	1.32	1.99	20.63	2273
2274	Soluble Bone.....	S. M. Hess & Bro., Philadelphia, Pa.	11.67	4.62	1.10	17.29	0.00	0.00	19.43	2274
2275	Ox Acid Phosphate.....	Tennessee Chemical Co., Nashville, Tenn.	10.42	3.05	0.62	14.09	0.00	0.00	16.16	2275
2276	Star Brand Raw Bone Meal.....	Star Tank & Fert. Wks., Mt. Carmel, Ill.	0.00	5.55	16.54	22.09	4.49	0.00	28.93	2276
2277	Waukesha Bone.....	Champion Fertilizer Co., Cleveland, O.	9.38	4.36	0.84	14.58	0.00	0.00	16.49	2277
2278	Geo. W. Mace's Dis. B. Phos. & Pot..	The Cleveland Dryer Co., Cleveland, O.	3.99	5.24	3.97	13.20	0.00	1.57	17.19	2278
2279	G. W. Mace's Big Crop B. Phos. & Pot.	The Cleveland Dryer Co., Cleveland, O.	6.13	3.73	2.00	11.86	0.00	3.50	19.20	2279
2280	Raw Bone Meal.....	The Armour Fert. Works, Chicago, Ill.	0.00	5.14	17.04	22.18	4.05	0.00	27.68	2280
2281	Bone Meal.....	The Armour Fert. Works, Chicago, Ill.	0.00	7.95	16.14	24.09	2.90	0.00	25.56	2281

2282 Acidulated Bone Meal	The Armour Fert. Works, Chicago, Ill.....	6.52	5.45	6.22	18.19	2.22	0.00	27.15	2282
2283 Star Phosphate	The Armour Fert. Works, Chicago, Ill.....	8.14	4.45	1.33	18.92	0.00	0.00	15.11	2283
2284 Phosphate and Potash	The Armour Fert. Works, Chicago, Ill.....	7.24	3.05	1.84	12.13	0.00	1.65	17.49	2284
2285 All Soluble	The Armour Fert. Works, Chicago, Ill.....	3.53	3.94	2.66	10.13	3.64	3.28	26.91	2285
2286 Ammoniated Bone with Potash.....	The Armour Fert. Works, Chicago, Ill.....	3.56	2.69	1.82	8.07	2.95	2.01	21.10	2286
2287 Grain Grower	The Armour Fert. Works, Chicago, Ill.....	4.46	3.57	3.30	11.33	2.25	2.11	22.50	2287
2288 Increscent Brand Raw Bone Meal.....	P. B. Mathlason Mfg. Co., St. Louis, Mo....	0.00	10.82	12.18	23.00	3.93	0.00	27.89	2288
2289 Increscent Brand Fine Gr'd B. Meal.....	P. B. Mathlason Mfg. Co., St. Louis, Mo....	1.15	9.06	11.08	21.29	3.64	0.00	31.86	2289
2290 Increscent Brand Ex. Fine Gr'd B. M.	P. B. Mathlason Mfg. Co., St. Louis, Mo....	1.23	8.40	10.57	20.20	3.04	0.00	28.94	2290
2291 Increscent Brand Acidulated Bone.....	P. B. Mathlason Mfg. Co., St. Louis, Mo....	5.58	3.74	7.41	16.73	3.18	0.00	27.08	2291
2292 Increscent Brand St. Louis Phosphate.....	P. B. Mathlason Mfg. Co., St. Louis, Mo....	2.17	3.91	7.06	13.14	3.10	0.00	22.05	2292
2293 Increscent Brand Acidulated B. & Pot.....	P. B. Mathlason Mfg. Co., St. Louis, Mo....	0.36	4.30	8.96	13.62	3.20	1.92	23.80	2293
2294 Dissolved Bone	The Farmer's Fert. Co., Indianapolis, Ind....	10.65	4.33	2.05	16.33	1.70	0.00	27.16	2294
2295 Acidulated Bone	The E. Raub & Son's Fert. Co., Indpls., Ind....	10.06	3.62	1.93	15.61	2.20	0.00	26.91	2295
2296 World of Good Raw Bone Wh. Grower.....	Thompson & Edwards, Chicago, Ill.....	2.66	5.18	7.77	15.61	2.76	1.05	26.18	2296
2297 Zell's Dissolved So. Carolina Phos.....	Zell Guano Co., Baltimore, Md.....	10.06	3.00	2.20	15.26	0.00	0.00	15.67	2297
2298 Western Bone and Potash	The Chicago Fertilizer Co., Chicago, Ill.....	3.94	7.10	3.07	14.11	0.00	3.41	21.39	2298
2299 Bone, Blood and Potash	The Chicago Fertilizer Co., Chicago, Ill.....	3.30	4.35	3.15	10.80	1.77	4.35	23.14	2299
2300 Alex. Miller & Co.'s Pack. House Bone.....	The E. Raub & Son's Fert. Co., Indpls., Ind....	1.94	5.61	7.57	15.12	3.73	0.00	26.30	2300
2301 Weldman's Fertilizer	Augustus Weldman, Hagerstown, Ind.....	1.51	6.30	4.45	12.36	1.47	1.71	20.21	2301
2302 Dissolved Bone	Read Fertilizer Co., New York, N. Y.....	8.41	2.85	1.46	12.72	0.00	0.00	13.51	2302
2303 Farmer's Friend	Read Fertilizer Co., New York, N. Y.....	6.79	2.58	0.94	10.21	2.73	2.31	24.58	2303
2304 Read's Standard	Read Fertilizer Co., New York, N. Y.....	5.38	2.93	0.84	8.93	1.27	3.81	20.37	2304
2305 Help Mate	Walker Strattan & Co., Pittsburg, Pa.....	6.58	3.03	0.77	10.36	1.27	0.00	17.70	2305
2306 Madison Pride	Gus Yunker, Madison, Ind.....	0.00	5.04	13.02	18.06	4.07	0.00	24.85	2306
2307 Imperial Raw Bone	Ohio Farmers' Fert. Co., Columbus, O.....	0.00	4.46	11.33	15.79	3.20	0.00	20.65	2307
2308 Desiccated Bone Meal	Ohio Farmers' Fert. Co., Columbus, O.....	0.00	3.43	10.39	13.82	1.83	0.00	15.16	2308
2309 Read's Blood and Bone No. 1	Read Phosphate Co., Nashville, Tenn.....	7.38	2.67	1.41	11.46	2.11	2.57	24.33	2309
2310 Read's Bone and Potash	Read Phosphate Co., Nashville, Tenn.....	8.78	3.51	0.46	13.15	0.00	2.58	21.44	2310
2311 Read's Alkaline Bone	Read Phosphate Co., Nashville, Tenn.....	8.39	3.79	0.51	12.69	0.00	2.47	20.32	2311
2312 Read's Wheat and Clover Grower.....	Read Phosphate Co., Nashville, Tenn.....	9.24	3.04	1.25	13.53	1.31	2.55	24.93	2312
2313 Benz Bros.' Pure B. and Tank. Fert.....	Benz Bros., Batesville, Ind.....	0.00	10.33	16.38	26.71	3.30	0.00	28.60	2313
2314 Acid Phosphate and Potash	Emery J. Smith & Co., Columbus, O.....	2.33	5.19	2.48	10.00	0.00	1.17	13.42	2314
2315 Soluble Bone and Potash	Hubbard & Co., Baltimore, Md.....	9.74	2.74	1.69	14.17	0.00	3.42	22.59	2315
2316 Raw Bone Meal	Louisville Fert. Works, Louisville, Ky.....	2.47	7.63	11.28	21.43	3.51	0.00	31.51	2316
2317 Bone Meal	Louisville Fert. Works, Louisville, Ky.....	4.40	8.32	9.57	22.29	2.31	0.00	30.48	2317
2318 Wheat Grower	Louisville Fert. Works, Louisville, Ky.....	5.27	3.20	0.84	9.31	0.00	2.00	14.76	2318
2319 Corn and Wheat Grower	Louisville Fert. Works, Louisville, Ky.....	5.59	4.48	1.18	11.25	0.29	0.13	15.83	2319
2320 Iron City	American Reduction Co., Pittsburg, Pa.....	5.19	2.69	2.03	9.91	2.44	1.45	21.31	2320
2321 Common Sense	American Reduction Co., Pittsburg, Pa.....	1.09	3.78	2.00	6.87	3.56	1.11	20.03	2321
2322 Pure Ground Bone	The Jarecki Chemical Co., Sandusky, O.....	2.56	8.04	12.47	23.07	3.02	0.00	31.38	2322
2323 Bone and Phosphate Mixture.....	The Jarecki Chemical Co., Sandusky, O.....	3.89	5.59	7.89	17.37	2.27	0.00	24.82	2323

*2283. Manufacturer claims error in sending sample. For later analysis see 2277.
 †2298, 2299 and 2308. Manufacturers claim error in samples, and will send new ones.

EXPLANATION OF THE TABLE.

In the table the attempt is made to give the name and composition of every fertilizer on sale in the State at the date of printing this bulletin. Letters were sent to every manufacturer doing business in the State, asking them to furnish us with the list of brands that they would offer for sale here during the coming year. If any omissions are found in the table, it is because the manufacturers' replies to these letters have not been received.

The tables contain a "relative value per ton." It is important to note what is intended by this. No attempt is made to state the agricultural value of the fertilizer or the return which a farmer may expect from a given quantity of any brand. The agricultural value would depend on many varying conditions, such as the crop to be raised, the composition and condition of the soil, the time and manner of applying the fertilizer, the amount of rainfall and sunshine, the temperature of the season, the drainage, and other conditions.

The "relative value per ton" is intended to mean the commercial value; that is, the sum for which a ton of the sample could be made and put on the market. The figures are only approximate and are probably rather above the selling price of the goods. In computing these valuations the following values were given to the various ingredients:

In plain superphosphates—

Available phosphoric acid, 6 cents per pound.

Insoluble phosphoric acid, nothing.

In acidulated mixed goods—

soluble phosphoric acid, 7 cents per pound.

Reverted phosphoric acid, 7 cents per pound.

Insoluble phosphoric acid, 2 cents per pound.

In bone, tankage, etc.—

Total phosphoric acid, $3\frac{1}{2}$ cents per pound.

In all goods—

Ammonia, 15 cents per pound.

Potash soluble in water, 6 cents per pound.

In order to find the estimated value per ton the following simple rules may be observed:

In plain superphosphates—

Multiply \$1.20 by the per cent. of soluble phosphoric acid.

Multiply \$1.20 by the per cent. of reverted phosphoric acid.

Add together the numbers so obtained and the sum is the estimated value of a ton of the goods.

In acidulated mixed goods—

Multiply \$1.40 by the per cent. of soluble phosphoric acid.

Multiply \$1.40 by the per cent. of reverted phosphoric acid.

Multiply \$0.40 by the per cent. of insoluble phosphoric acid.

Multiply \$3.00 by the per cent. of ammonia.

Multiply \$1.20 by the per cent. of potash.

In case the tag reads nitrogen instead of ammonia multiply \$3.64 by the per cent. of nitrogen shown on the tag.

Add together the numbers so obtained and the sum is the estimated commercial value of a ton of the goods.

In bone, bone and potash, tankage etc.—

Multiply \$0.70 by the per cent. of total phosphoric acid.

Multiply \$3.00 by the per cent. of ammonia.

Multiply \$1.20 by the per cent. of potash.

Thus suppose the tag on a plain acid phosphate shows the goods to contain—

Soluble phosphoric acid, 11.99 per cent.

Reverted phosphoric acid, 3.92 per cent.

Then—

$$\$1.20 \times 11.99 = \$14.39$$

$$1.20 \times 3.92 = 4.70$$

Estimated value per ton.....\$19.09

If the tag shows that the acidulated mixed fertilizer contained—

Soluble phosphoric acid.....4.25 per cent.

Reverted phosphoric acid.....5.50 per cent.

Insoluble phosphoric acid.....2.02 per cent.

Ammonia2.02 per cent.

Potash2.23 per cent.

\$1 40 × 4.25\$5 95

1 40 × 5.50 7 70

40 × 2.02 81

3 00 × 2.02 6 06

1 20 × 2.23 2 68

Estimated value\$23 20

For a bone the sum of the phosphoric acid must be used. If the tag read—

“Reverted” phosphoric acid.....5.22 per cent.

Insoluble phosphoric acid.....16.22 per cent.

Ammonia 5.43 per cent.

The total phosphoric acid would be.....21.44 per cent.

And the calculation would be—

\$0 70 × 21.44\$14 91

3 00 × 5.43 16 29

Estimated value per ton\$31 20

The legal standard of all fertilizers sold in Indiana is the analysis printed on the tag of the State Chemist attached to the sack. The indefinite "guaranteed analysis" sometimes printed on the sacks has no standing under the Indiana law. If there are no State Chemist's tags attached to the goods, the goods are not legally on sale, and no good citizen should become a party to the violation of a law intended to protect the rights of purchasers of fertilizers. Unless the goods have tags attached you have no legal guarantee that the goods contain any valuable fertilizer ingredients, and such cases should be at once reported to the State Chemist, Lafayette, Indiana.

METEOROLOGICAL TABLES.

TABLE I.

Monthly and Annual Meteorological Summaries for 1898, as Deducted from the Records of Observations Made by the Weather Bureau at Indianapolis, Ind. Appropriate Headings Show the Nature of the Data in the Columns Immediately Underneath.

1898. MONTHS.	Mean Barometer Reduced to Sea Level—Inches.	Mean Temperature—Degrees.	Relative Humidity—Per Cent.	Maximum Temperature—Degrees.	Minimum Temperature—Degrees.	Prevailing Direction of Wind.	Number of Clear Days.	Number of Partly Cloudy Days.	Number of Cloudy Days.	Average Cloudiness During the Month. Scale 0 to 10.	Number of Days on which 0.01 Inch or More of Precipitation Fell.	Total Amount of Precipitation—Inches.	Number of Days on which Min. Temp. Fell below Freezing.
January	30.070	33.8	79	67	5	W	5	9	17	6.9	15	4.98	21
February	30.138	32.3	79	68	—4	S	6	8	14	6.6	13	1.47	20
March	30.056	46.5	72	72	23	S	7	8	16	6.4	17	9.90	9
April	29.952	50.4	61	76	20	N	9	10	11	5.7	8	1.73	5
May	30.000	63.4	66	84	40	NE	8	11	12	5.8	17	2.59	0
June	30.031	73.7	64	91	54	NE	9	16	5	5.0	9	1.77	0
July	29.999	76.8	61	95	54	NE	12	13	6	4.5	7	5.52	0
August	29.998	74.6	72	93	59	SW	6	17	8	5.8	8	2.63	0
September . . .	30.044	70.2	74	93	47	S	13	4	13	5.1	10	4.23	0
October	30.068	53.4	79	84	27	S	6	8	17	7.1	11	4.86	1
November . . .	30.120	39.8	72	69	3	S	5	12	13	6.5	8	2.39	14
December . . .	30.130	29.4	77	60	—2	SW	12	3	16	6.1	9	2.08	24
Annual means.	30.050	53.6	71	81.0	27.2	S	..	..	..	6.0	..	..	..
Annual totals .	..	..	..	..	..	..	98	119	148	..	132	44.10	94

TABLE II.

Daily and Monthly Mean Temperature of Indianapolis, Indiana, for 1898. The Daily Means were Made by Adding the Maximum and Minimum Temperature of Each Day Together and Dividing the Sum by Two. The Thermometers are 154.8 Feet Above Ground and Exposed in a Standard Shelter of the Weather Bureau Pattern.

DATE.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	18	12	29	42	71	68	82	76	82	68	47	30
2.	14	9	28	42	68	76	84	76	84	74	50	37
3.	24	8	30	41	60	74	79	73	83	76	52	40
4.	32	30	32	39	51	74	73	68	76	71	59	26
5.	28	32	34	28	46	74	71	71	77	68	54	22
6.	34	31	44	34	44	78	74	74	70	61	40	28
7.	36	40	48	43	52	80	76	76	60	66	44	22
8.	41	44	52	48	60	76	77	72	62	64	54	16
9.	37	52	56	54	64	76	74	70	66	60	49	14
10.	38	58	56	52	60	76	66	73	60	66	40	15
11.	44	46	54	53	63	76	66	75	58	61	38	29
12.	54	34	54	57	59	76	69	72	64	52	36	28
13.	38	40	46	50	58	73	70	71	64	49	44	13
14.	33	34	48	51	62	76	78	72	68	44	38	10
15.	34	32	58	54	67	68	80	74	66	48	35	26
16.	30	28	60	58	64	75	82	76	66	59	38	32
17.	32	44	50	66	61	70	80	75	72	52	46	34
18.	34	42	55	57	70	74	80	74	74	42	50	35
19.	38	40	62	52	72	70	82	70	74	44	43	42
20.	46	36	48	46	70	69	82	70	69	50	43	44
21.	39	24	52	52	72	67	77	76	70	40	56	43
22.	44	25	56	62	70	67	80	82	68	50	39	42
23.	35	30	40	53	70	69	82	83	70	46	20	36
24.	32	26	39	50	72	78	84	80	74	56	22	27
25.	42	22	44	54	66	80	78	76	70	48	27	29
26.	29	29	50	52	66	77	77	75	75	37	17	30
27.	28	29	60	52	69	73	81	70	67	36	22	28
28.	35	28	46	52	68	70	76	71	68	44	29	24
29.	28	..	38	54	66	75	78	79	76	49	34	44
30.	28	..	36	62	62	80	72	82	72	43	27	43
31.	22	..	36	..	63	..	72	82	..	42	..	20
Mean	33.8	32.3	46.5	50.4	63.4	73.7	76.8	71.6	70.2	53.4	39.8	29.4

TABLE III.

*Daily and Monthly Precipitation at Indianapolis, Ind., for 1898,
the Rain Gauge 146 Feet Above Ground.*

DATE.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.
1.	T	.00	.06	.00	.00	.00	.00	T	.00	.53	.00	.00
2. . . . .	.00	.01	.02	.00	.05	.00	.00	.28	.00	T	.00	.00
3. . . . .	.00	.00	.00	.00	T	.00	.02	.44	.00	.00	.00	.00
4. . . . .	.00	.00	.00	.02	.11	.00	1.20	.00	.32	.75	.00	.32
5. . . . .	.00	T	.00	T	.27	.00	.00	.00	.91	T	.82	.00
6. . . . .	.23	.00	.00	.00	.22	.00	.00	.00	.13	.00	.00	T
7. . . . .	.00	.00	.00	.00	.05	T	.00	.00	T	.00	.00	T
8. . . . .	.00	.02	.00	.00	.00	.35	T	.69	.00	.00	.00	.00
9. . . . .	.91	.01	.00	T	.00	.11	.00	.00	.00	.00	.89	.00
10. . . . .	.09	T	T	.00	.01	.29	.00	.00	.00	.37	.33	.00
11. . . . .	.00	.18	.25	T	.02	.24	.00	.00	.00	1.30	T	.00
12. . . . .	.30	.01	.44	.00	.46	T	.00	.00	.00	.00	.00	.35
13.	T	T	1.38	.53	.00	.51	.00	.00	.35	T	.01	.02
14. . . . .	.08	.04	T	.06	.02	.01	.00	.00	.00	T	T	.00
15. . . . .	.28	.14	.61	.00	.01	.00	T	.00	.38	.00	.00	.00
16. . . . .	.01	.00	.28	.00	.14	.00	.00	.00	T	.00	.00	T
17. . . . .	.00	T	T	.00	.00	.01	.11	.63	.01	1.10	T	.13
18. . . . .	.00	.30	.06	T	T	.00	.00	1.08	.00	T	.00	.00
19. . . . .	.46	.26	.36	.25	.59	.00	T	.00	.00	.09	T	1.08
20. . . . .	.97	.22	.17	T	.04	.00	.00	.00	.00	.18	.00	.03
21.	T	.26	.67	.00	.22	T	.00	.08	.00	.02	.00	T
22. . . . .	.84	.01	2.36	.04	.16	.00	.00	T	.76	.02	.17	.04
23. . . . .	.09	T	.58	.80	.00	.01	.00	.00	.04	.00	T	.00
24. . . . .	.00	.01	.00	T	.00	.00	.00	.02	1.16	.00	.00	.00
25. . . . .	.62	T	.00	.02	.00	.24	.28	T	.14	.49	.00	.01
26. . . . .	.01	.00	.07	.00	.00	T	2.61	T	.00	.01	.04	T
27. . . . .	.00	.00	2.18	.00	.00	T	.00	.01	.00	.00	.00	.00
28. . . . .	.00	.00	.31	.01	.01	.00	.00	.00	.00	.00	.11	.00
29.	T	. . .	.00	T	.21	.00	.92	T	.00	T	.02	.00
30. . . . .	.02	. . .	.06	T	.00	.00	.38	.00	T	T	.40	.10
31. . . . .	.01	. . .	.00	. . .	.00	. . .	.00	.00	. . .	T	. . .	T
Mean	4.93	1.47	9.90	1.73	2.59	1.77	5.52	2.63	4.23	4.86	2.39	2.08

"T" indicates trace of precipitation (less than 0.01 inch).

TABLE IV.

Highest and Lowest Temperature (in Degrees Fahrenheit) at Indianapolis, Indiana, During Each of the Periods 1873-1898, Inclusive. Weather Bureau Observations.

MONTH.	1873.		1874.		1875.		1876.		1877.		1878.		1879.		1880.		1881.		1882.		1883.		1884.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
January.	60	-13	63	1	44	-18.5	69	9	58	-11	54	-2	57	-22	66	20	47	-5	61.5	7	45	-11	59.8	-25
February.	63	1	59	17	55	-8	66	11	63	20	72	18	74	-1	65	14	59	18	65	15	72	4	66.2	1.6
March.	61	2	72	20	77	9	72	23	73	3	80	23	82	21	88	21	62	20	80.5	24	69.4	12	69.5	5
April.	81	32	71	27	79	19	77	33	88	28	81	35	87	36	85	27	78	20	80.5	37	85.3	30.4	84	31.4
May.	86	47	89	40	88	34	86	31	88	45	91	50	91	47	86	40	86	44	80.5	44	89	35	84	40.6
June.	94	62	96	50	91	51	91	51	91	51	96	58	96	58	93.5	55	101	57	89	45	89	50	92.8	54.7
July.	91	51	97	56	92	63	93	61	90	54	92	53	93	53	89	51	101	55.5	89	53	92	53	89	50.2
August.	95	51	96	56	87	51.5	88	48	89	57	88	44	80	38	89	41	94.5	48	86	42	87	40.4	90.3	44.8
September.	86	42	90	41	90	35	88	42	85	42	85	42	86	30.5	78	31	80	39	79	35.5	81	35	87	31.2
October.	76	25	78	28	75	28	75	28	83	35	81	23	86	28.5	63	31	80	39	72	22	65	10	66.8	12.3
November.	59	13	71	-2	61	14	73	18	61	9	65	-5	75	55	56	-13	63	14	57	-10	62	9	60.7	12.3
December.	62	12	61	12	68	-1	47	-15	67	20	48	-12	64	55	56	-13	63	14	57	-10	62	9	60.7	12.3

MONTH.	1885.		1886.		1887.		1888.		1889.		1890.		1891.		1892.		1893.		1894.		1895.		1896.		1897.		1898.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
January.	51.7	-11.3	55.3	-15	64.4	-11.3	59.8	-6	58	10	70	14	58	-12	54	-5	53	-15	60	-7	58	-12	55	-5	64	-14	67	-5
February.	59	-6	75.9	15.6	66.2	10.5	69	8.8	64	71	69	64	65	8	61	11	75	12	68	14	68	14	68	12	65	24	72	23
March.	63.8	3.2	84	24.5	69.5	15.8	69	30.9	71	22	78	28	65	8	61	9	81	30	82	31	82	31	82	26	85	34	84	40
April.	78.3	27.8	84	39.1	85	22.4	83.3	36	80	35	87	39	86	36	82	41	88	39	85	33	85	33	85	31	87	48	91	54
May.	87.7	35.3	87.1	46.9	89	49	86.2	45.3	89	41	97	50	94	54	94	56	96	54	96	54	96	54	96	52	98	55	95	61
June.	90.1	41.1	89	50.9	100.8	58.6	94.8	57.5	92	51	97	56	94	52	94	56	97	54	97	54	94	49	96	54	98	50	93	54
July.	94.5	47.5	94.8	50.9	100.8	58.6	94.8	57.5	92	51	97	56	94	52	94	56	97	54	97	54	94	49	96	54	98	50	93	54
August.	95.1	47.5	94.8	50.9	100.8	58.6	94.8	57.5	92	51	97	56	94	52	94	56	97	54	97	54	94	49	96	54	98	50	93	54
September.	83.8	38.4	90.2	43.3	93.1	34	87.9	33.7	90	29	84	33	88	35	85	28	84	33	88	35	85	28	84	33	88	35	85	28
October.	77.8	31.4	82.3	31.7	82.4	22.3	78	25.7	67	12	68	12	61	20	63	14	66	12	61	20	63	14	66	12	61	20	63	14
November.	69.8	23.7	71.6	16.5	73.5	3.8	76	17.4	66	12	68	12	61	20	63	14	66	12	61	20	63	14	66	12	61	20	63	14
December.	56.3	-2.1	57.7	-3.5	57	3	56	17.4	66	12	68	12	61	20	63	14	66	12	61	20	63	14	66	12	61	20	63	14

TABLE V.

Annual Means for the Years 1872 to 1898, Arranged for Comparative Purposes, and Compiled from the Records of the U. S. Weather Bureau, Department of Agriculture, at Indianapolis, Ind.

YEAR.	Mean Barometer Reduced to Sea Level—Inches.	Mean Temperature—Degrees.	Mean Relative Humidity—Per Cent.	Maximum Temperature During the Year—Degrees.	Minimum Temperature During the Year—Degrees.	Prevailing Direction of Wind.	No. of Clear Days.	No. of Fair Days.	No. of Cloudy Days.	Av. Amount Cloudiness—Scale, 0 to 10.	No. of Days on Which 0.01 Inch or More of Precipitation Fell.	Total Amount of Precipitation.	Greatest Precipitation in Any Consecutive 24 Hours—Inches.	No. of Days on Which the Maximum Temperature Was Below Freezing.	No. of Days on Which the Minimum Temperature Was Below Freezing.	No. of Days on Which the Temperature Was Above 90 Degrees.
1872.	30.044	50.8	57.8	96.0	-11.0	WS	85	142	189	5.0	122	34.07	3.71	49	120	17
1873.	30.004	52.0	69.2	95.0	-13.0	NW	97	141	127	5.0	145	52.32	2.73	88	99	9
1874.	30.037	50.5	63.0	97.0	-2.0	W	97	150	118	5.0	120	43.60	2.61	17	81	27
1875.	30.005	50.5	66.1	92.0	-18.5	W	81	138	146	5.0	155	54.58	2.86	44	107	5
1876.	29.997	53.2	68.1	93.0	-15.0	WS	83	126	157	6.0	155	57.53	2.70	30	101	9
1877.	30.008	54.0	67.2	90.0	-11.0	WS	98	141	126	5.0	139	39.08	2.07	20	84	0
1878.	29.946	55.4	61.6	96.0	-12.0	ES	84	159	122	6.0	148	38.62	2.03	17	68	13
1879.	30.035	53.9	64.4	96.0	-22.0	WS	94	135	136	5.0	122	42.88	2.33	27	98	12
1880.	30.030	54.4	65.4	94.0	-13.0	WS	106	145	115	5.0	123	50.99	2.00	26	99	9
1881.	30.024	54.9	67.4	101.0	-13.0	WS	100	140	125	5.0	112	48.74	4.30	28	91	31
1882.	30.045	53.8	71.1	94.0	-10.0	NW	107	141	117	5.3	141	53.68	3.02	19	78	4
1883.	30.059	51.8	66.2	92.0	-11.0	WS	96	157	111	5.4	164	54.12	3.71	35	106	6
1884.	30.044	52.5	67.6	92.8	-25.0	WS	99	144	123	5.5	159	39.99	2.16	40	91	6
1885.	30.019	49.3	73.9	95.1	-11.3	WS	92	153	120	5.5	147	39.81	2.87	42	111	15
1886.	30.039	51.0	71.3	94.3	-15.0	WS	108	150	107	5.2	138	33.08	2.11	47	127	13
1887.	30.044	52.7	66.0	100.0	-11.8	WS	113	146	106	5.1	119	41.36	1.89	31	120	34
1888.	30.082	50.6	68.8	97.5	-6.0	NW	113	119	134	5.1	124	41.36	2.62	36	103	17
1889.	30.062	53.1	69.3	92.0	-1.0	SW	113	113	157	5.5	113	38.41	2.44	18	71	5
1890.	30.066	54.0	68.6	96.9	4.4	SW	77	144	144	6.2	189	54.87	4.41	25	72	23
1891.	30.066	53.5	69.0	94.0	-3.0	NW	113	108	114	5.7	145	38.23	2.86	25	80	25
1892.	30.079	52.0	71.0	97.0	-5.0	NW	96	128	143	5.9	150	39.77	2.73	41	104	16
1893.	30.041	52.0	66.0	92.0	-15.0	NW	113	115	137	5.6	144	39.35	1.60	44	114	28
1894.	30.069	54.5	67.6	99.0	-7.0	NW	108	133	124	5.6	127	33.54	2.69	26	83	39
1895.	30.076	52.1	67.7	100.0	-14.0	NW	125	124	116	5.2	126	33.54	6.90	46	108	39
1896.	30.088	54.1	68.2	98.0	-6.0	SW	102	142	121	5.1	135	39.94	2.34	24	98	25
1897.	30.074	53.0	71.4	99.0	-14.0	NW	140	112	113	5.6	137	42.15	3.23	24	98	29
1898.	30.050	53.6	71.0	94.6	-4.3	WS	98	119	148	6.0	132	44.10	2.89	27	94	19

TABLE VI.

Monthly Mean Atmospheric Pressure Reduced to 32° Fahrenheit and the Level of the Sea, for Each Year of the Period 1872 to 1898, Inclusive, as Recorded at the Office of the U. S. Weather Bureau at Indianapolis, Ind.

MONTH.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
January	30.180	30.056	30.170	30.232	30.107	30.160	30.022	30.151	30.026	30.186	30.159	30.162	30.188	30.156
February	30.098	30.044	30.089	30.129	30.070	30.156	30.117	30.112	30.049	30.092	30.101	30.283	30.060	30.028
March	30.043	30.030	30.041	29.999	29.982	30.013	29.912	30.073	30.059	29.824	30.057	30.057	30.040	30.086
April	29.980	29.896	30.016	29.964	29.978	29.894	29.746	29.969	29.946	29.963	30.927	29.965	29.948	30.014
May	29.988	29.885	29.940	29.922	29.968	29.962	29.904	29.961	29.974	29.967	29.965	29.940	29.956	29.909
June	29.976	29.905	29.925	29.948	29.881	29.907	29.806	29.964	29.947	29.906	29.908	29.931	30.009	30.013
July	29.764	29.982	29.984	29.935	29.957	29.931	29.912	29.827	29.957	29.965	30.012	30.012	29.918	29.944
August	30.032	30.013	29.952	29.945	30.001	29.926	29.876	29.951	29.976	30.006	29.941	30.050	30.034	29.946
September	29.997	30.032	30.020	30.020	29.954	29.967	30.050	30.081	30.033	30.017	30.067	30.043	30.062	30.025
October	30.085	30.062	30.083	29.989	29.972	29.963	30.028	30.108	30.062	30.130	30.034	30.090	30.153	29.973
November	30.112	30.010	30.116	30.037	29.980	30.038	30.010	30.078	30.207	30.163	30.177	30.161	30.131	30.101
December	30.218	30.125	30.165	29.936	30.109	30.097	30.082	30.080	30.124	30.180	30.152	30.136	30.156	30.108

MONTH.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
January	30.053	35.031	30.750	30.056	30.211	30.084	30.146	30.084	30.151	30.085	30.204	30.190	30.070
February	30.114	30.156	30.086	30.174	30.080	30.055	30.109	30.166	30.176	30.210	30.018	30.091	30.138
March	29.975	30.055	30.121	30.084	30.086	30.037	30.084	30.085	30.084	30.058	30.114	30.052	30.082
April	30.029	30.089	30.154	30.018	30.098	30.062	30.080	29.942	29.949	29.969	30.062	30.062	30.052
May	29.925	29.974	29.940	29.974	29.936	29.936	29.945	29.926	29.946	30.056	29.966	30.040	30.000
June	29.951	29.942	29.934	30.012	29.990	29.934	29.950	29.984	30.016	30.054	29.104	29.960	30.031
July	29.983	29.975	30.037	30.015	29.990	29.934	30.078	29.984	30.024	30.022	30.042	29.942	29.969
August	29.982	29.991	30.041	30.068	30.083	30.000	30.122	29.964	30.031	29.072	30.058	30.000	29.968
September	30.094	30.054	30.082	30.054	30.105	30.050	30.115	30.046	31.060	30.073	30.012	30.161	30.044
October	30.198	30.146	30.014	30.149	29.971	30.150	30.108	30.071	30.010	30.130	30.094	30.106	30.083
November	30.051	30.084	30.146	30.102	30.111	30.110	30.133	30.108	30.146	30.160	30.134	30.126	30.120
December	30.169	30.095	30.142	30.134	30.128	30.129	30.167	30.179	30.164	30.080	30.226	30.128	30.130

TABLE VII.

Mean Temperature and Total Monthly Precipitation for Each Month of the Period 1872 to 1898, Inclusive. Compiled from the Records of the U. S. Weather Bureau at Indianapolis, Ind.

MONTHLY MEAN TEMPERATURE IN DEGREES, FAHRENHEIT.

Month	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898
Jan..	26.6	24.5	35.5	20.0	38.6	27.8	34.5	26.5	45.9	23.7	31.6	24.5	21.6	22.5	21.2	24.4	23.3	34.1	37.4	34.2	23.8	17.9	34.6	22.9	30.0	25.0	33.8
Feb..	29.6	35.0	37.9	31.2	37.0	34.0	29.8	30.1	38.7	29.8	42.3	32.0	34.7	30.5	28.2	38.2	35.7	27.0	30.0	29.4	30.0	40.2	47.4	21.7	32.4	32.5	32.3
March	35.0	51.2	45.8	49.3	52.0	53.8	49.6	42.5	41.6	36.8	44.8	36.1	41.1	33.0	39.4	38.2	35.7	44.4	38.0	29.4	37.4	40.2	54.0	47.4	39.8	42.9	46.8
April	64.8	63.9	66.6	62.4	65.7	61.9	61.6	66.2	68.4	70.2	58.5	60.9	60.2	51.5	64.3	52.6	53.3	53.6	59.6	55.4	56.6	52.0	54.0	61.7	55.2	60.0	50.8
May..	73.0	76.7	78.3	70.8	71.9	73.3	72.8	71.4	73.3	72.6	71.6	71.5	73.2	68.8	69.2	67.3	60.5	61.6	61.6	63.8	61.7	72.8	76.4	75.6	71.3	70.0	63.4
June..	77.7	75.3	78.3	75.6	77.7	75.8	79.1	79.5	75.9	79.4	72.6	75.1	73.7	76.3	72.9	80.6	75.2	74.2	75.7	74.2	75.6	72.8	76.4	74.2	75.9	77.0	76.8
July..	75.9	74.8	75.5	70.2	75.0	73.1	75.2	72.6	75.6	79.0	73.0	70.4	72.3	70.0	72.9	73.3	60.9	64.5	62.9	70.6	71.2	73.4	74.8	76.2	74.7	72.3	74.6
August	66.7	63.8	68.6	63.1	64.4	66.3	67.0	61.7	64.2	73.5	60.2	68.8	68.3	63.9	66.6	65.8	60.9	64.5	65.0	70.8	67.4	69.0	69.8	70.8	64.2	71.4	70.2
Sept..	53.3	53.3	49.8	55.0	50.8	51.1	54.2	54.0	52.9	48.8	43.3	45.0	41.5	41.9	55.3	40.5	42.4	50.8	45.5	59.4	56.4	55.7	55.9	49.4	52.2	61.2	63.4
Oct..	35.3	37.0	42.1	35.9	41.1	42.6	44.9	45.4	31.2	42.8	43.3	45.0	41.5	41.9	39.3	30.3	34.0	40.9	46.7	33.1	34.2	41.0	39.1	42.3	44.6	43.6	39.8
Nov..	23.8	37.2	35.3	41.2	22.6	46.3	29.9	35.6	24.2	40.2	30.4	34.4	29.9	32.0	25.2	30.3	34.0	46.7	33.1	40.8	30.0	32.8	35.8	34.1	44.6	43.6	39.8
Dec..	23.8	37.2	35.3	41.2	22.6	46.3	29.9	35.6	24.2	40.2	30.4	34.4	29.9	32.0	25.2	30.3	34.0	46.7	33.1	40.8	30.0	32.8	35.8	34.1	44.6	43.6	39.8

TOTAL MONTHLY PRECIPITATION, IN INCHES AND HUNDRETHS.

Month	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898
Jan..	1.17	4.50	3.75	1.01	5.94	1.56	2.38	1.47	6.32	2.10	3.74	1.32	1.05	3.31	4.02	1.48	2.81	2.52	10.20	2.00	1.55	2.77	1.43	3.12	1.60	3.71	4.98
Feb..	1.41	2.85	4.17	1.84	4.49	1.21	2.10	2.17	3.16	6.43	7.28	7.19	4.73	1.54	1.51	4.61	2.45	1.29	5.28	5.97	3.53	6.16	4.90	0.86	2.47	2.37	1.47
March	1.31	3.90	5.79	5.23	7.44	5.23	1.23	3.36	4.03	4.60	6.11	3.25	3.01	0.82	2.95	2.78	4.26	2.45	4.46	5.77	1.93	1.69	2.82	1.30	3.06	6.85	9.90
April	3.24	5.91	4.44	1.29	2.27	3.11	5.51	2.25	6.43	2.60	3.68	2.73	2.89	3.62	3.09	3.92	1.05	2.07	4.58	2.30	6.33	8.50	2.72	1.94	1.27	4.39	1.73
May..	3.23	3.49	4.03	5.13	5.11	2.09	3.24	3.38	8.22	3.78	7.65	4.02	4.80	3.76	3.82	2.39	4.52	5.76	3.61	1.61	8.83	3.15	4.52	1.07	3.56	4.39	2.59
June..	3.23	3.70	5.25	12.20	7.54	6.21	2.25	2.94	8.48	3.92	9.35	4.59	4.11	5.71	4.92	2.82	2.65	4.98	4.45	2.90	3.84	3.02	3.76	1.49	3.09	3.70	1.77
July..	11.00	11.28	3.53	13.12	7.48	4.19	4.54	2.40	2.26	0.82	3.43	6.12	6.03	1.43	2.27	1.41	3.93	5.98	0.97	1.92	2.93	0.84	1.35	2.87	5.72	5.70	5.52
August	2.69	1.32	2.90	3.96	5.86	4.1	2.42	5.71	1.66	3.25	4.51	2.48	4.04	3.50	3.43	2.15	5.84	5.54	5.00	5.79	1.34	0.61	1.66	1.91	3.91	0.42	2.63
Sept..	2.81	1.76	2.09	1.34	4.32	3.32	3.35	6.94	1.96	3.25	0.72	2.72	3.09	3.50	3.20	0.55	1.23	8.79	7.31	0.74	2.42	3.63	1.82	1.76	1.62	0.79	4.23
Oct..	1.07	5.27	0.36	2.67	4.42	3.32	4.78	1.34	3.54	6.11	8.56	6.11	2.18	1.20	2.28	1.01	1.70	4.02	1.18	0.28	0.28	3.01	2.51	0.83	1.65	0.45	4.86
Nov..	0.80	2.55	4.82	3.04	2.26	2.87	5.82	2.58	9.35	2.50	6.90	6.90	1.46	2.71	3.87	3.71	5.07	4.97	3.35	5.08	4.90	3.25	1.55	5.81	1.65	6.87	2.39
Dec..	2.10	5.90	2.79	4.01	0.90	2.45	3.95	5.10	1.44	5.40	2.53	4.34	1.65	2.45	2.20	4.52	1.91	2.76	1.64	2.96	1.84	3.28	3.41	4.86	1.13	3.09	2.08

EFFECT OF THE WEATHER ON THE CROPS DURING THE SEASON OF 1898.

January.—Moderate winter weather during the month was very favorable for the various crops. During the colder days the fields were covered by light snow, except in the northern portion, where good snow-covering protected the wheat, and near the end of the month wheat and grasses were in good condition; they had a good start and were deep-rooted. Fruit germs were apparently safe.

February.—Mild winter weather continued, and wheat and rye continued to winter fairly well; freezing and thawing did no great damage to these cereals, especially in the northern portion, where snow covered the fields, and, at the end of the month, rye and wheat looked well and green in many fields; they were small, and in some fields they looked brown, especially in the central portion, where the tops had been frosted, but the roots were sound and in good condition. New timothy seed was coming on very well; clover had suffered from freezing and wet weather; it had heaved in many fields and had been badly frozen in others. Grass was in good condition. Fruit germs were apparently safe. Live stock wintered well, and was in fine condition. In more southern counties farmers began preparing for spring crops.

March.—Light and heavy rains, nearly every day from the 10th of the month, retarded spring farm work much; many fields were too wet for plowing and seeding, or under water, and but little plowing for corn could be done. Some oats were sown and some gardens made; quite a number of tobacco beds were sown and potatoes and peas planted. Warm weather the greater portion of the month and the rains improved wheat, rye and barley very much, and, at the end of the month, they were in excellent condition, and grass began to turn green. Fruit buds advanced much; frosts on the 24th and 29th apparently did no damage; peaches, plums and apples began to bloom in the southern portion of the State. Spring clover had only been lightly touched by frosts.

April.—Cool weather and frequent showers were quite favorable to growing crops. Frost occurred on many nights, but did no injury, except to some fields of spring clover and to some tobacco beds. Wheat, rye, barley and other crops improved much, and, at the end of the month, these crops were in good, promising condition. Potatoes planted during the month came up slowly, the ground being so cool. Field peas were planted and came up well; oats were sown. All fruit trees, except apples, were covered with thick bloom and promised good yields; small fruit was budding. Plowing and seeding was often interrupted by rains, but during the latter part of the month plowing advanced more rapidly, with the ground in good condition, and some corn had been planted.

May.—Seasonable temperature and frequent local rains were very beneficial to growing crops, but the rains delayed farm work, especially plowing and corn planting, and, at the end of the month, all corn had not been planted. Rye and wheat had headed and were in bloom; barley was ripening, and timothy and clover were heading. The tobacco plants were nearly ready for transplanting, and clover-hay cutting had begun. All tree fruit, except apples, promised good yields; strawberries were ripening and other berries were blooming. Meadows and pasturage were green and in good condition.

June.—Very favorable weather prevailed for growing crops, and later for harvest. The nights were often cool, but the days were moderately warm, with much sunshine, and local rains were quite frequent. At the end of the month the rye and wheat harvest progressed, and threshing had begun; the yield was very great and the quality excellent. Haying had begun, and heavy and excellent crops of hay, clover and timothy were secured in best condition. Oats ripened rapidly; the heads were well filled, but the straw was short. Corn grew rapidly, and much had been "laid by." The setting out of tobacco plants had been delayed and but little had been transplanted at the end of the month. There were no apples, but a fair crop of peaches, pears, plums and cherries; all kinds of berries and grapes were abundant.

July.—Warm, dry weather prevailed during the greater portion of the month, until near the end, when numerous good local rains improved all growing crops, which began to show the bad effects of dry weather; corn improved and grew rapidly; it was in silk and tassel before the end of the month, promising a very good crop. Tobacco was in fair condition; pasturage, which had become brown and dry, again turned green, and all vegetation grew well; tomatoes ripened and were ready for canning; rye and wheat were in shock by the middle of the month, and threshing progressed rapidly; the oats harvest had begun. Heavy crops of hay were secured in excellent condition. Peaches, plums and pears promised fair crops, but the apples had mostly fallen off; the grape crop promised to be very large, but the dry weather had diminished the prospect of large berry crops. Fall plowing had begun. Light frosts formed in a few localities of the northern portion, but did no injury.

August.—Warm days, cool nights and frequent local rains improved all growing crops—corn, potatoes, vegetables, buckwheat, millet, tobacco, etc.—and put the ground in good condition for plowing. In some localities, where heavy rain fell, some wheat and oats were injured. At the middle of the month, tobacco, improved by rains, was in fair condition; corn was earing well; potatoes grew well; young clover had been much improved; tomatoes and melons were ripening, and great quantities of tomatoes had been canned. Fall plowing progressed, with the ground in best condition; threshing of wheat and rye continued, and, in some fields, it had ended. Plums, pears and grapes were abundant, peaches less so,

and there were but few apples. Very favorable weather continued during the latter part of the month, and, at its end, corn had matured rapidly; early-planted was ripening, the shucks were drying nicely, and, in some fields of the southern portion, much had been cut and put in shock; tobacco was in good condition, but only small in some fields; late potatoes promised good yields; in the northern portion, in localities, they were still green and some in bloom; clover-seed hulling had commenced; millet and buckwheat looked well; garden truck and all vegetables were abundant; a large crop of melons had been sent to market. Fall plowing had nearly ended; the sowing of rye had begun, and early sown had come up; oat threshing continued, with fair results. Pasturage was green and live stock in good, healthy condition.

September.—Warm, dry weather in the earlier part of the month was followed by cooler weather and showers. The rains delayed farm work, but were beneficial to the early-sown wheat and rye. Oat threshing had been delayed by rains, but, near the end of the month, threshing had ended; the yield was fair and of good quality. Much sorghum molasses was made. Occasional light frosts did no injury, and, by the middle of the month, most corn was safe from frost, and, at its end, most had been put in shock. Tobacco cutting and curing progressed well; at the end of the month, most had been housed in good condition. Very large quantities of tomatoes were canned and cucumbers pickled. The yield of potatoes was good in the northern portion, less so in other portions of the State; sweet potatoes promised well. All vegetables, cabbage, turnips, onions, etc., yielded well; the melon and pumpkin crops were large and good. Pasturage was green and live stock in good, healthy condition.

October.—Moderate temperature prevailed, and frequent rains fell; frost formed on several mornings, but the heavy frosts, which would have assisted in ripening corn, came late, and much corn and fodder of the immense crop molded and rotted in shock, because of much rain and early cutting. Corn husking and wheat sowing still continued; both were delayed by the frequent rains. Wheat, at the end of the month, looked well; it grew rapidly and rank, and fears were entertained that severe winter weather would injure it unless it was protected by a sufficient snow covering during the extremely low temperatures. Early-sown timothy was in very good condition. Vegetation grew much; in Madison County peach trees were in second bloom. Pasturage was still green and looked well.

November.—The weather during November was quite favorable to winter crops; during colder weather, near the end of the month, they were well protected by snow covering in the central and northern portions, but in the southern portion, less snow having fallen, the crops suffered in some fields during the freezing weather. Wheat continued to be in good condition for wintering; it was deep-rooted and vigorous, but rank in some fields. Grass was in very good condition. Corn was not

all in crib; on some farms husking continued, with fodder still out in the fields. A fair crop of tobacco was being stripped. Live stock was in best condition, with plenty of fodder.

December.—During the cold, freezing weather the greater portion of the month snow covered the fields most everywhere, and wheat was well protected and looked well; in a few localities only, where the snow had drifted or had been swept away by the wind, the ground was frozen hard, and some wheat looked brown and injured. Fruit buds were apparently not injured by the cold, except peach buds, which, possibly, were killed in some orchards. Grass was in good condition, feed abundant and live stock in good condition. Much ice, from 6 to 8 inches thick, was cut and hauled from the 15th to the 24th of the month.

ANNUAL SUMMARY, 1898.

The year 1898 must be considered a warm year; in nine months the average temperature was in excess of the normal, especially January and March; were exceedingly warm. The average annual temperature, 53.3 degrees, is 1.3 degree above the normal, the greatest excess in temperature is noted in the southern portion, the least in the northern portion.

The annual amount of precipitation, 45.71 inches, is 5.51 inches above the normal; in six months there was an excess and in six months there occurred a small deficiency. The total amounts in March were very excessive everywhere, also in January and October. The greatest excess in precipitation is noted in the central portion and the least in the northern.

Considering the seasons, it appears that an excess in the average temperature occurred in all seasons, except in the average temperature of the autumn, which was slightly below the normal. Of the winter months, December was the only one where the average temperature was in excess; the average temperature for January was 6.8 degrees above the normal, and February was also a warm month. In the spring the average temperature for March was 7.1 degrees above the normal, while April was a very cold month. The average temperature during the summer was excessive in every month. In the autumn, September was a very warm month; the average temperature in October was only slightly in excess, but November was a cold month, as was also December.

The precipitation was excessive in all seasons, except in summer, when a slight deficiency occurred, although the total amounts in the summer and spring were the greatest during the year. The months with excessive amounts of precipitation were January, March, May, August, September and October, and in the other months the average amounts were deficient. The greatest excess in precipitation is noted in the winter, and the least in the autumn, while in the summer the average amount was deficient.

THE SEASONS OF 1898.

*The Year Begins With December, 1897, the Beginning of Winter,
and Ends November 30, 1898, the End of Autumn.*

MONTHS AND SEASONS.	TEMPERATURE, DEGREES FAHRENHEIT.				PRECIPITATION, INCHES.			NUMBER OF DAYS—			
	Mean.	Normal.	Departure from Normal.	Monthly Range.	Total.	Normal.	Departure from Normal.	Clear.	Partly Cloudy.	Cloudy.	Rainy
December, 1897 . .	31.6	33.2	-1.6	59	2.65	2.79	-0.14	6	8	17	10
January, 1898. . .	33.4	26.6	+6.8	58	5.27	3.06	+2.21	8	8	15	11
February	32.5	31.1	+1.4	68	1.87	3.34	-1.47	7	8	13	9
Winter, 1898 . . .	32.5	30.3	+2.2	62	9.79	9.19	+0.60	21	24	45	30
March	45.8	38.7	+7.1	53	8.11	3.72	+4.39	10	7	14	14
April	49.5	52.5	-3.0	58	2.06	3.46	-1.40	11	9	10	8
May	63.1	61.8	+1.3	47	4.49	4.18	+0.31	12	10	9	12
Spring, 1898 . . .	52.8	51.0	+1.8	53	14.65	11.36	+3.30	33	26	33	34
June	73.2	72.1	+1.1	42	3.81	4.04	-0.23	14	11	5	8
July	76.4	74.9	+1.5	48	3.02	3.32	-0.30	16	10	5	7
August	74.2	73.4	+0.8	53	3.36	3.01	+0.35	15	9	7	8
Summer, 1898 . .	74.6	73.5	+1.1	48	10.19	10.37	-0.18	45	30	17	23
September	69.6	66.0	+3.6	52	4.06	3.10	+0.96	14	9	7	8
October	53.9	53.3	+0.6	59	4.66	2.34	+2.22	8	9	14	12
November	38.8	40.9	-2.1	63	2.87	3.87	-1.00	10	9	11	8
Autumn, 1898 . .	54.1	53.4	-0.7	58	11.49	9.31	+2.18	32	27	32	28
Year	53.5	52.0	+1.5	53	46.13	40.23	+5.90	131	107	127	115

CLIMATOLOGICAL DATA FOR INDIANA, YEAR 1898.

STATIONS.	COUNTIES.	TEMPERATURE (DEGREES FAHRENHEIT).						PRECIPITATION (INCHES).						SKY.				Prevailing Direction of Wind.		
		Elevation, Feet.	Length of Record, Years.	Annual Mean.	Highest.	Date.	Lowest.	Date.	Total for the Year.	Greatest Monthly.	Month.	Least Monthly.	Month.	Total Snowfall.	Number Rainy Days.	Number Clear Days.	Number Partly Cloudy Days.		Number Cloudy Days.	
SOUTHERN.																				
Bedford	Lawrence	681	5	..	101	July	24	9	Dec.	18	5	8.45	Feb.	0.94	Feb.	..	..	..	..	..
Booneville	Warrick	416	1	..	100	July	3	3	Dec.	14	13	7.89	Feb.	1.20	June	20.5	123	183	73	99
Bright	Dearborn	..	3	..	102	July	3	3	Dec.	14	14	52.77	Feb.	1.86	Feb.	17.3	108	161	81	123
Butler	Jennings	14	3	54.4	99	July	23	9	Dec.	14	15	48.04	Feb.	1.08	Feb.	17.3	108	161	81	123
Columbus	Bartholomew	632	15	53.6	97	July	23	16	Dec.	14	15	53.77	Feb.	1.70	July	15.7	118	168	101	96
Edwardsville	Floyd	386	4	57.4	94	July	23	6	Feb.	3	4	44.78	Nov.	1.06	Nov.	4.3	126	169	88	108
Edwardsville	Vanderburgh	386	4	57.9	96	July	23	6	Feb.	3	4	44.78	Nov.	1.06	Nov.	4.3	126	169	88	108
Greensburg	Decatur	954	3	..	96	July	2	8	Dec.	11	6	10.84	Aug.	0.94	Aug.	..	..	..	..	..
Jasper	Dubois	450	6	..	97	July	2	8	Dec.	11	6	10.84	Aug.	0.94	Aug.	..	..	..	..	..
Jeffersonville	Clark	455	9	57.1	97	July	3	6	Feb.	3	9	54.16	Nov.	1.65	Nov.	12.0	71	177	105	83
Madison	Jefferson	460	7	56.0	96	July	3	3	Dec.	14	7	50.79	Nov.	1.42	Nov.	20.5	108	150	53	162
Marion	Crawford	363	17	56.1	98	Sept.	3	11	Dec.	14	17	55.72	Nov.	1.34	Nov.	16.7	123	110	119	136
Mc. Vernon	Posey	410	10	..	98	Sept.	24	2	Dec.	14	10	7.92	Nov.	0.88	Nov.	..	110	200	37	128
Paoli	Orange	611	1	..	98	July	2	3	Dec.	14	16	53.42	Nov.	1.91	Nov.	12.0	71	177	105	83
Princeton	Gibson	481	16	56.2	93	July	2	3	Dec.	14	16	53.42	Nov.	1.91	Nov.	12.0	71	177	105	83
Rockport	Spencer	338	1	..	98	July	2	3	Dec.	14	1	9.49	Nov.	1.65	Nov.	..	..	..	..	..
Salem	Washington	570	5	..	102	July	24	6	Dec.	14	1	7.72	Nov.	0.83	Nov.	..	..	..	..	..
Scottsburg	Scott	610	11	..	97	July	2	6	Dec.	14	11	46.80	Nov.	1.59	Nov.	18.0	..	..	..	..
Seymour	Jackson	525	34	57.6	98	July	3	0	Dec.	14	34	58.50	Nov.	1.60	Nov.	15.0	95	111	101	153
Vevay	Switzerland	431	5	55.1	101	July	3	0	Dec.	14	34	58.50	Nov.	1.60	Nov.	15.0	95	111	101	153
Vincennes	Knox	431	5	55.1	101	July	3	0	Dec.	14	34	58.50	Nov.	1.60	Nov.	15.0	95	111	101	153
Washington	Daviess	484	4	57.5	100	Sept.	4	4	Dec.	14	4	47.84	Nov.	1.54	Nov.	4.3	120	107	156	102
Worthington	Greene	540	17	54.8	98	Sept.	3	13	Dec.	14	17	49.12	Nov.	1.54	Nov.	14.6	120	107	156	102
Mean	15	56.0	102	July	3	16	Dec.	14	15	49.44	Nov.	1.86	Nov.	16.1	106	155	89	121

CENTRAL.

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St. Wayne!	Allen...	775	1	97	July	14	—	8	Feb.	3	1	...	5.	6Sept.	2,081	April	27.5</
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* In other months and on other dates also.

† In other months also.

† In other directions also.

Record incomplete.

NOTE.—All records are used in determining State or district temperature means and average or total precipitation, but State and district departures are determined by comparison of current data of only such stations as have normals.

C. F. R. WAPPENHANS.

Local Forecast Official and Section Director, Indianapolis, Ind.

PURDUE UNIVERSITY.

ELEVENTH REPORT

OF THE

Agricultural Experiment Station.

LAFAYETTE, INDIANA.

COVERING THE SIX MONTHS ENDING JUNE 30, 1898.

BOARD OF CONTROL.

Charles B. Stuart, President.....Lafayette, Tippecanoe County.
William A. Banks.....Laporte, Laporte County.
Sylvester Johnson.....Irvington, Marion County.
David E. Beem.....Spencer, Owen County.
Job H. VanNatta.....Lafayette, Tippecanoe County.
Benjamin Harrison.....Indianapolis, Marion County.
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James M. Barrett.....Fort Wayne, Allen County.
John Martin.....Brookville, Franklin County.

JAMES H. SMART, LL. D.,
President of the University.

EDWARD A. ELLSWORTH,
Secretary.

JAMES M. FOWLER,
Treasurer.

STATION STAFF.

Charles S. Plumb, B. S.....Director.
William C. Latta, M. S.....Agriculturist.
James Troop, M. S.....Horticulturist.
Henry A. Huston, A. M., A. C.....Chemist.
Joseph C. Arthur, D. Sc.....Botanist.
Arvill W. Bitting, D. V. M.....Veterinarian.
William Stuart, M. S.....Assistant Botanist.
William B. Anderson, B. S.....Assistant Agriculturist.

The Station will take pleasure in sending its publications free to all citizens of the State who may be interested in them.

Address

DIRECTOR EXPERIMENT STATION,
Lafayette, Ind.

ELEVENTH REPORT
OF THE
Purdue University Agricultural Experiment Station

**REPORT OF THE DIRECTOR
AND OTHER OFFICERS.**

To President James H. Smart:

Sir—The following very brief report is for the six months ending June 30, 1898. It has been customary during the past ten years to have the Station report cover the calendar year ending December 31, but upon the recommendation of the Director of the Office of Experiment Stations of the United States Department of Agriculture, a change is herewith made, by which in future, the annual report will cover the twelve months ending June 30.

The purpose of this change is to publish the annual report so that it may be available to the Department of Agriculture officials in making up the report of that department for Congress. There will also be some advantage in this for the Station Staff, in giving them a season of more relaxation in preparing manuscript for the printer during the relief from class work in summer. Heretofore, the report has been prepared in winter during a season busy with university duties.

It is consequently the purpose of the Director to make this report for the six months quite short, and the following one for the year ending June 30 somewhat extended, and containing details of experimental work.

The experimental work during these six months is of less duration than during the remaining months, owing to the fact that the Station Staff is occupied till the latter part of March, to a considerable extent, in teaching. In the chemical department a considerable amount of time has been given to preparation work for the sugar beet experiments for 1898. A very large amount of seed furnished by the United States Department of Agriculture has been distributed to several hundred farmers, and 768 samples of seed have been mailed with directions for planting and cultivation. The sugar beet work this year, through the intelligent and inter-

ested co-operation of many farmers, promises to give a much greater return to the Station in the way of information than for any previous year. Some miscellaneous analytical work has been in progress relating to buckwheat, soils, etc. The work of this department has also been curtailed, owing to the lack of an Assistant Chemist for five of the six months.

In the veterinary department a large amount of original work has been conducted on the physiology of the milk gland and the process of milk secretion. This work is now about completed, and is in partly manuscript form, and will be published during the ensuing twelve months. The Veterinarian has also conducted, personally or through an assistant, a large number of tuberculin tests, and has assisted quite a number of interested dairymen in securing tuberculin tests through the aid of local veterinarians. In every case the Station has secured records of these tests, so that there is now on file here at the Station several thousand records of such tests. In addition to this work, some time has been devoted to hog cholera studies, and to giving more or less assistance to stockmen having sick, diseased or injured animals.

In the horticultural department three experiments begun late in 1897 were continued during the winter, viz.: (1) Sub vs. surface irrigation of lettuce; (2) sub-irrigation of lettuce, first, by means of a soft brick bottom to the bed, to facilitate even water distribution, and, second, by means of tile; (3) sub-irrigation vs. surface irrigation for tomatoes. The results of this work favor sub-irrigation, both as to weight of crop and period of maturity. In the orchard, considerable work in spraying various fungicides and insecticides on the trees and vines was carried on, especially with the arsenites, whale oil soap, chloronaphtholeum and Bordeaux mixture. A limited amount of variety tests with fruits and vegetables are in progress.

In the botanical department lettuce was grown upon a sub-watered bench, subject to the use of different combinations of chemical fertilizers to note the effect of potash, phosphoric acid and nitrogen on the crop. Pot culture studies of lettuce in the same field were also made. The study of the relation of weight and size of seed to resulting crop is being continued, peas and beans being grown this year for that purpose. The work in the vegetation house with plants in pots included the lettuce, beans and roses, subject to different amounts and kinds of plant food. Mushroom culture has been undertaken in the mushroom pit, but hardly with success. This work, however, will be continued. Considerable attention has been given to examinations of plants suffering from fungous diseases, and especially rusts and smuts, and the curl of peaches, and pockets of plums.

The agricultural department was busily engaged in April and May in making the experimental plantings of corn, oats, kaffir corn, soy beans, cowpeas, sunflowers, sorghum, Russian and Idaho field peas and some forage crops, grasses, etc., and attending to the necessary cultural work

in connection with these crops. The work with forage crops this year at the Station is on a more extensive scale than heretofore, and interesting results from these studies are looked for. Among the varieties of wheat on trial, a number from the United States Department of Agriculture seem to be failures. Quite a variety of tests of different kinds bearing on dates of planting, depth, use of cultural implements, methods of seeding, etc., are in progress, more specific information concerning which can be found in the report of the Agriculturist further on.

Feeding experiments with live stock have been in constant operation during the past six months. These particularly bear on the use of grain rations for suckling lambs and pigs, and on other rations for growing pigs.

Four half-acre fields have been planted to mangels, each to a different variety, and these fields are under experimental observation. The varieties will be analyzed and the crop fed next winter.

The Station Staff remains as for some years, excepting for the resignation of Mr. J. M. Barrett, Assistant Chemist, who severed his relations with the Station February 1, to accept a more lucrative place elsewhere. Mr. Barrett was always a most faithful and intelligent employe of the Station. Mr. A. H. Bryan, a graduate of Purdue University, will, on July 1, become Assistant Chemist in place of Mr. Barrett.

Improvements have been made on but a limited scale, but some much-needed fencing has been erected. Eighty-two rods of Shimer woven wire fence, on steel posts, have been erected eastward from the west side of the farm, along the main highway, terminating at the lane east of the horticultural grounds. This beautiful and strong fence replaces a wooden one that was a disgrace to the institution. About one hundred and thirty-five rods of Kitzelman woven wire fence was also erected on the south side of the farm, fifty-eight of which was along by the railway track, shutting it off from the small pastures, the remainder being used in building more small acre pasture lots, connecting with the pig and sheep quarters. The fencing of the agricultural department and Station is now largely in good repair, excepting in a small way, and for the first time in many years. In June the old portion of the Station building was reshingled and a skylight placed in the roof, and the roof over the general chemical laboratory reshingled and most of the old shutter ventilators taken out and the remaining spaces ceiled up.

Publications have been issued as follows during the past six months:

PAMPHLET BULLETINS.

Bulletin No. 68, Vol. IX, March, 1898, pp. 32, Figs. 13. The sugar beet in Indiana. By H. A. Huston and J. M. Barrett.

Bulletin No. 69, Vol. IX, March, 1898, pp. 33-40. Insecticides, fungicides and spraying. By James Troop.

Bulletin No. 70, Vol. IX, May, 1898, pp. 41-52, Figs. 14-16. The relation of water supply to animal diseases. By A. W. Bitting.

Bulletin No. 71, Vol. IX, June, 1898, pp. 53-64.

1. Cornmeal and shorts as food for pigs. By C. S. Plumb and W. B. Anderson.
2. Skim milk as food for young growing chickens. By W. B. Anderson.

NEWSPAPER BULLETINS.

These bulletins are distributed to periodicals published in Indiana, and to a limited degree outside of the State, 700 being printed in each edition. They are from 450 to 500 words long, and deal with important and timely topics. Communications from over one hundred editors in the State this spring show warm appreciation of their contents, with a desire for their continuation.

- No. 53. March 2, 1898. Spring wheat for Indiana. By W. C. Latta, Agriculturist.
- No. 54. March 25, 1898. Strawberry notes. By James Troop, Horticulturist.
- No. 55. March 25, 1898. Some desirable varieties of raspberries and blackberries. By James Troop, Horticulturist.
- No. 56. April 20, 1898. The protection of crops from frosts. By H. A. Huston, Chemist.
- No. 57. April 27, 1898. Cowpea culture in the North. By W. C. Latta, Agriculturist.
- No. 58. May 5, 1898. Dipping sheep for ticks. By A. W. Biting, Veterinarian.
- No. 59. May 20, 1898. Fruit prospects in Indiana. By James Troop, Horticulturist.
- No. 60. June 4, 1898. Peach leaf curl and plum pockets. By J. C. Arthur, Botanist.
- No. 61. June 29, 1898. Feeding skim milk to growing chickens. By C. S. Plumb, Director.

Mailing List.—On June 30th, the mailing list of the Station numbered 15,324 names, and the pamphlet bulletins were distributed as follows:

To persons in Indiana	12,320
To persons outside of Indiana	2,144
To persons in foreign countries	114
To Indiana periodicals	654
To outside periodicals	92

Total 15,324

I herewith submit in connection with the preceding report, brief statements of the work of the several departments of the Station, as transmitted to me by the heads of the departments.

Respectfully submitted,

C. S. PLUMB, Director.

REPORT OF THE AGRICULTURAL DEPARTMENT.

To C. S. Plumb, Director:

Sir—The following is a brief outline of the work of the Agricultural Department for the six months ending June 30, 1898:

1. Test of Varieties.—Thirty-one varieties of wheat, thirteen of oats, three of kaffir corn, eight of soy beans, four of cowpeas, six of sorghum, one of vetch, two of sunflowers, three of clover, one each of brome grass, sweet corn and spring rye. Idaho and Russian wax field peas, and alfalfa, from home-grown and imported seed, are also under trial.

Several varieties of wheat sent out by the Department of Agriculture are under trial here for the first time, and most of them are apparent failures. Several new varieties of oats are also under trial. The purpose is to limit the tests of wheat and oats largely to the new kinds that the Station may be able to advise the farmers of their relative merits as compared with standard varieties.

Several kinds of forage plants comparatively new to this section are under trial. The experiments with forage crops are being conducted on a larger and more comprehensive scale than heretofore.

2. Test of methods of culture, with reference to effect on yield of crop and on conservation of soil moisture.

3. Test of early and late planting of corn.

4. Test of thick and thin planting of corn.

5. Test of deep and shallow culture of corn.

6. Test of planting corn in furrow and on the level.

7. Test of corn cultural implements.

8. Test of fertilizer upon wheat when applied as a top dressing, and also when drilled in with the seed.

9. Tests of commercial fertilizers and fresh horse manure in wheat, oats and corn.

10. Test of the lasting effect of horse manure on yield of corn.

11. Test of turning under a green manure (rye or crimson clover, cornstalks or straw), as means of renewing the soil in continuous corn culture.

12. Test of sowing clovers at intervals during the growing season.

13. Test of sowing wheat in drills six and eight inches apart respectively.

Most of the experiments above named have been in progress several years.

The past winter was quite severe upon wheat, much of which was put in late last fall owing to drouth at that time.

The wheat that was sown after rain fell, early in October, is better than that sown earlier.

Owing to the late start and the rather severe winter the stand of wheat is rather thin. The wheat blades are considerably rusted, but the stems appear to be quite free. The wheat is slightly infested with the green aphid and there is an unusual amount of wheat scab. The standard and acclimated varieties are but slightly affected, but over 50 per cent. of the heads of some of the newer varieties are affected. The varieties most injured by wheat scab are White Golden Cross, Pedigree, Giant, Diamond Grit, Gold Coin and Oakta Chief. As a rule the wheat pests have made their attacks too late to do very serious damage. The wheat crop which is now being harvested, appears to be of good quality and promises more than an average yield.

Although frequent heavy rains in May delayed planting, the spring crops are at this writing (June 29th) in good condition.

The oat crop promises well, although it shows an unusual amount of smut.

Owing to delay in planting, much of the corn is very backward. It will therefore be liable to suffer in case of drouth or early autumn frosts.

W. C. LATTA,

June 29, 1898.

Agriculturist.

REPORT OF THE HORTICULTURAL DEPARTMENT.

Professor O. S. Plumb, Director:

Sir—The following is a brief report of the work of the Horticultural Department for the past six months:

The three experiments which have been running all winter in the greenhouse are: (1) Sub vs. surface irrigation for lettuce; (2) sub-irrigation for lettuce, (a) with soft bricks in the bottom of the bed for the purpose of evenly distributing the water over the entire bed; (b) with two rows of two-and-a-half-inch tile running the entire length of the bed and across one end, filling in water from one end; (3) sub vs. surface irrigation for tomatoes in (1), one bed four feet four inches by twenty-five feet, was lined with zinc and arranged as described in (a) above, leaving a space for soil above the bricks of five inches. The water was all applied by means of a tube to the bottom of the bed and was fed to the plants by capillary attraction. The other bed of the same dimensions was five inches deep, filled with soil and watered entirely upon the surface. The results obtained are very much in favor of the sub-irrigation, both as to weight of crop and time of maturing. In (2) the results are in favor of the soft bricks as a base for sub-irrigation bed, although the first cost of arranging the bed with tile was only about one-seventh that of brick. In (3) the results are decidedly in favor of sub-irrigation, as the following figures will show: Two varieties were used in the experiment, viz.: Lorillard and Stone. The first variety is the one generally used for forcing, but my experiments showed very clearly that the Stone is in all respects equal to it as a forcing variety, especially when sub-irrigation is used.

Following are the comparative yields of fruit of the sub and surface irrigated plants:

LORILLARD.

Surface irrigation111 fruits, average weight 1.84 oz.

Sub-irrigation103 fruits, average weight 4.7 oz.

STONE.

Surface irrigation64 fruits, average weight 2.47 oz.

Sub-irrigation94 fruits, average weight 4.23 oz.

As will be seen the Lorillard fruits averaged 2.22 oz. in favor of the sub-irrigation, while the Stone averaged 1.76 oz. in favor of the same method. While Lorillard yielded a few more fruits than Stone, there were more of them too small for marketable purposes.

The experiments in spraying consist in the use of arsenites, whale-oil soap, chloronaphtholeum and Bordeaux mixture. Varietal tests of fruit and vegetables are being continued.

JAMES TROOP,
Horticulturist.

July 1, 1898.

REPORT OF THE CHEMICAL DEPARTMENT.

Professor C. S. Plumb, Director:

Sir—The attention of the Chemical Department has been chiefly occupied during the past six months with the matter of testing the sugar beet question in Indiana. A considerable number of Sugar Beet Associations have been found and we have aimed to secure their co-operation. Some of these associations have distributed seed and we have sent out 768 samples from the Station. The purpose has been to secure field conditions for the beets, and for this reason larger quantities of seed have been sent out to each party than is usually used in seed distribution.

During the month of January an investigation of buckwheat was begun. This plant is structurally in an intermediate position between the grasses and the legumes. The work was not quite finished when Mr. Barrett resigned as Assistant Chemist at the end of January.

Miscellaneous work, including an examination of marls, crematory ash and minerals has been conducted as circumstances permitted.

The interest of the people in sugar beet work was so great that I thought it best to give personal attention to every detail of the work rather than assign it to a clerk. The absence of an Assistant Chemist from February to July has reduced the amount of analytical work to be reported upon.

Mr. A. H. Bryan went on duty as Assistant Chemist July 1st, and began work on feeding material.

Very respectfully,

H. A. HUSTON,
Chemist.

July 8, 1898.

REPORT OF THE BOTANICAL DEPARTMENT.

To C. S. Plumb, Director:

Sir—The work of the Botanical Department of the Station for the six months ending June 30, 1898, was in brief as follows:

Lettuce was grown in the greenhouse upon a sub-watered bench divided into seven sections five of which were severally treated with different combinations of chemical fertilizers and two left untreated as controls. Similar studies have been made with lettuce in cans under vegetation-house conditions. Fine growth was secured in both cases and the knowledge of the subject as presented in Bulletin No. 66, printed in October, 1897, has been considerably extended.

A crop of dwarf peas replaced the lettuce in the greenhouse, and was harvested in June. The problem in this case was in regard to the influence that the size of seed exerts upon subsequent generations. The same problem is also being studied by growing beans in sub-watered beds upon trucks as part of the vegetation-house work. Six trucks are employed.

The work upon the questions in connection with use of chemical fertilizers in growing roses is being continued in lines similar to the studies of last year.

Some work upon growing mushrooms in an outdoor cellar has given only partial success.

Attention has been given to the occurrence of plum pockets and peach curl, diseases which have been especially prevalent during the past growing season, and a newspaper bulletin, No. 60, was issued for the information of the public.

More attention than usual has been directed to the cereal rusts. The rust on oats has been definitely connected with a form apparently quite dissimilar, not infrequent on the wild buckthorn (*Rhamnus lanceolata*), a shrub in woodlands that attracts little attention. Sowings of the spores of the buckthorn rust were made on oats in the greenhouse during June, and the typical oat rust appeared upon the leaves in eight days.

Some attention has been given to a hardy evergreen bedding plant, blooming in May, a native of Indiana, but not before brought into cultivation.

Respectfully submitted,

J. C. ARTHUR,

Botanist.

July 5, 1898.

REPORT OF THE VETERINARY DEPARTMENT.

To C. S. Plumb, Director:

Sir—Since submitting a report of the Veterinary Department December 31, 1897, the work has been almost wholly confined to a study of the embryology, anatomy and physiology of the mammary gland. The results are to be published in a bulletin in the near future, and hence a summary will not be required at this time.

The Department has several lines of work under observation—the treatment of contagious abortion among cows, tuberculosis, hog cholera and stable hygiene, but the results are not ready for publication.

A bulletin upon "The Relation of Water Supply to Animal Diseases" was submitted in May.

Respectfully yours,

A. W. BITTING,
Veterinarian.

TREASURER'S REPORT, EXPERIMENT STATION.

As Treasurer of Purdue University, I hereby submit my report of all moneys received during the year ending June 30, 1898, on account of Experiment Station funds:

From U. S. Government	\$15,000 00
From farm receipts	1,709 13
Total	<u>\$16,709 13</u>

JAMES M. FOWLER,
Treasurer Purdue University.

FINANCIAL STATEMENT.

The Agricultural Experiment Station of Indiana, in account with the United States, for the year ending June 30, 1898:

DEBIT.

Received of the Treasurer of the United States, receipts as shown by the Treasurer's report.....	\$15,000 00
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CREDIT.

Salaries	\$8,871 83
Labor	3,082 82
Publications	618 14
Postage and stationery	120 37
Freight and express	102 41
Heat, light and water	303 21
Chemical supplies	214 97
Seeds, plants and sundry supplies	572 85
Fertilizers	30 31
Feeding stuffs	167 57
Library	128 37
Tools, implements and machinery	234 83
Furniture and fixtures	47 05
Scientific apparatus	88 47
Live stock	186 35
Traveling expenses	43 55
Contingent expenses	7 22
Building and repairs	179 68
Total	\$15,000 00

I hereby certify that the above is a correct statement of expenditures in Station Fund for year ending June 30, 1898.

E. A. ELLSWORTH,
Secretary Board of Trustees.

**IMPROVEMENT FUND EXPERIMENT FARM FOR YEAR ENDING
JUNE 30, 1898.**

DEBIT.

Balance June 30, 1897.....	\$79 98
• Receipts from farm for 1898.....	1,709 13

CREDIT.

Salaries	\$300 47
Labor	230 00
Heat, light and water.....	58 20
Seeds, plants and sundry supplies.....	11 43
Furniture and fixtures	115 50
Contingent expenses	99 60
Balance	973 91

Total	\$1,789 11
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I hereby certify that the above is a correct statement of expenditures from Improvement Fund for year ending June 30, 1898.

E. A. ELLSWORTH,
Secretary Board of Trustees.

THE SUGAR BEET IN INDIANA.

H. A. HUSTON AND J. M. BARRETT.

SUGAR STATISTICS.

During the past year the sugar beet question has aroused much popular interest and the subject has been the topic of very many and varied newspaper articles. Public speakers have talked about the subject at many meetings of farmers and business men. The subject has been treated from many points of view. In many cases the matter of the world's sugar statistics has furnished the starting point. In regard to these some most surprising statements have been made. Thus one speaker stated that the annual sugar production of a single island was 400,000,000 tons, or about fifty-five times the annual sugar production of the world. The latest available and reliable estimates are of importance in such discussions. For this reason the latest estimates from Mr. Licht, the noted German sugar statistician are here copied from the Louisiana Planter and Sugar Manufacturer of January 29, 1898:

Beet Root Sugar Crop:	Tons.
Germany	1,850,000
Austria-Hungary	840,000
France	825,000
Russia	750,000
Belgium	225,000
Holland	125,000
Other countries.....	190,000
Total beet sugar.....	4,805,000
Cane Sugar Crop:	
Java	560,000
Louisiana	345,000
Cuba	200,000
Hawaiian Islands.....	200,000
Philippine Islands	190,000
Brazil	180,000
Demerara	110,000
Mauritius	110,000
Egypt	100,000

Cane Sugar Crop:	Tons.
Antilles	95,000
Peru	65,000
Porto Rico	60,000
Trinidad	50,000
Barbadoes	50,000
Gaudeloupe	40,000
Reunion	40,000
Jamaica	35,000
Martinique	30,000
Total cane sugar.....	2,460,000
Grand total	7,265,000

The usual Cuban crop, in times of peace is something over 1,000,000 tons. Later returns from the Louisiana crop give 316,000 tons. The American production of beet sugar in 1897 seems to have been about 45,000 tons. In the localities where factories are located the season was generally unfavorable and the tonnage lower than usual.

The total consumption of sugar in the United States in 1897 is estimated at 2,100,000 tons, or approximately 30 per cent. of all the sugar produced in the world. If the American production for the past year be taken at 360,000 tons, the United States produced 17 per cent. of the sugar which it consumed. Approximately, \$100,000,000 were sent out of the country to pay for imported sugar.

It should be noted that the government statistics for sugar generally relate to the fiscal year ending June 30, while the above figures relate to the year ending December 31.

INDIANA SUGAR BEET WORK.

For the past ten years the Indiana Experiment Station has been conducting experimental work on the sugar beet. The following summary will show the extent of the work from 1888 to 1897, under the supervision of H. A. Huston, Station Chemist:

Year.	Number of Stations in Indiana.	Number of Counties.	Number of Analyses at Purdue.
1888.....	1	1	9
1889.....	1	1	5
1890.....	8	8	25
1891.....	38	21	149
1892.....	39	26	110
1893.....	27	22	104
1894.....	47	22	115
1895.....	1	1	51
1896.....	5	5	28
1897.....	143	35	307

The number of stations includes only those from which samples were received. Up to the present year returns were received from about 30 per cent. of those to whom seed was sent. For several reasons seed was sent into every county in the State. Samples have been received from 63 counties. The main purpose of this work has been to find out whether the agricultural and climatic conditions in Indiana were such as to permit of the profitable production of the sugar beet.

Until the present year much difficulty has been met in inducing farmers to undertake and finish the work of raising even small plats of beets. Before any one who is likely to succeed in the manufacture of beet sugar will consider a proposition to erect a factory in any given locality, he must know with certainty, first, whether that locality has suitable conditions of soil and climate for the production of beets of satisfactory quality, and, second, whether the farmers of that locality will contract to raise enough beets to insure the factory a supply of raw material from which to manufacture the sugar.

These two facts can only be learned by experience. Most of the experimental work in sugar beet raising has been conducted on too small a scale to allow the farmer to become acquainted with the kind and amount of labor involved in producing beets for factory purposes. Hence it was determined to conduct the work this season on such a scale that farmers might form a fair opinion of the work as it is conducted under field conditions, and be better prepared to consider contracts for raising beets on a commercial scale if occasion should arise. The wisdom of this decision was plainly shown, for before the end of the year in several localities in the State farmers had propositions offered to them to raise a considerable acreage of beets.

CLIMATIC CONDITIONS.

An examination of the climatic conditions of those countries where the beet is most successfully produced shows that the best beet territory is found to have an average temperature of about 70 degrees Fahrenheit for the three summer months. In discussing the possible introduction of the beet industry into new territory, it is customary to connect all points having an average summer temperature of 70 degrees by a line. This line is called the isotherm of 70 degrees. Lines are drawn parallel to this line, at a distance of 100 miles on either side. The belt of land included between these lines is considered to be the portion of the country where the beet is most likely to be successfully grown. The area north of the heavy line on the map, Fig. 1, shows the portion of Indiana that falls within this belt.

It is not to be understood that every place falling within this belt is necessarily a place where beets can be profitably produced or that it is impossible to produce good beets in some places outside of this belt.

There are other climatic conditions that also have an important bearing on beet production. Of these, the rainfall during the crop season is of great importance.

The rainfall should be suitable in amount and distribution to insure the continuous growth of the beets until the ripening period in September. The amount per month should not be less than two inches, nor is it desirable to have more than four inches. When the beet has reached its full size a low rainfall is desirable to allow the ripening of the beets. During this period it is desirable that the monthly rainfall should be less than two inches. A low rainfall in the months of July and August may arrest the growth of the beet before it has reached its full size. Should heavy rain and a relatively high temperature prevail in September, the beets will take on a second growth. Under these conditions the beets usually fail to ripen and to develop their full content of sugar; when cooler weather sets in, they may have only the usual sugar content of from 10 to 11 per cent. for growing beets.

TABLE I. AVERAGE TEMPERATURE FOR 14 YEARS. DEGREES FAHRENHEIT.

COUNTIES.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Northern	23.4	26.8	35.1	53.3	60.2	70.7	74.0	70.9	64.8	51.0	38.6	30.9
Central	26.4	30.2	37.9	52.3	61.7	72.0	74.3	71.6	66.1	52.3	40.4	33.1
Southern	30.2	33.9	41.4	55.8	63.8	73.6	75.8	74.4	67.8	54.7	43.5	35.8

AVERAGE TEMPERATURE IN 1897. DEGREES FAHRENHEIT.

Northern	22.7	29.7	38.7	47.9	56.7	68.2	76.1	69.3	67.4	57.3	39.8	27.5
Central	24.7	32.7	42.6	50.4	57.4	70.8	76.6	70.7	69.0	59.6	42.5	31.5
Southern	28.6	35.8	46.3	53.9	60.1	72.7	77.9	74.3	77.9	62.3	45.6	35.7

AVERAGE PRECIPITATION IN INCHES—14 YEARS.

Northern	2.49	2.57	2.52	3.06	4.47	3.81	3.07	2.82	3.11	1.86	3.46	2.52
Central	2.99	3.09	2.98	3.54	3.98	3.92	3.11	3.24	3.21	1.80	4.01	2.78
Southern	3.64	4.06	3.96	4.01	3.96	4.20	3.55	3.45	3.30	2.02	4.47	3.06

AVERAGE PRECIPITATION IN 1897.

Northern	4.11	1.81	3.86	2.88	3.48	4.75	1.82	2.44	0.50	1.20	4.71	2.11
Central	3.10	2.49	6.52	4.82	3.32	4.12	3.37	1.47	0.87	0.82	7.99	2.87
Southern	2.96	4.45	9.59	5.30	2.79	4.06	4.90	0.86	0.58	1.50	6.92	2.96



FIG. 1.

The average temperature and rainfall of the different sections of Indiana by months, for fourteen years, are given in Table I. This division of the State is purely arbitrary. The lines of equal temperature are not parallel to the boundaries of the State. These lines of equal temperature for the summer are shown in Fig. 2. The form of these lines is due to the influence of the Ohio and Wabash valleys on one side, and to the great lakes and lower Michigan peninsula on the other. From this peculiar combination, it results that Logansport, Indianapolis and Vevay (at the extreme southeastern point of the State) have the same mean temperature for July, as shown by the records, extending from twenty-five to forty-one years. For the three summer months, the mean temperature of the northern section is 71.9 degrees; of the central, 72.8 degrees; and for the southern, 74.6 degrees. The mean annual rainfall for the northern section is 37.1 inches; for the central, 39.7 inches; and for the southern, 45.0 inches. This excess for the southern counties is distributed over every month of the year except May. In May the rainfall is greatest in the northern counties, but the average amount in all sections is ample for crop purposes. So far as the beet crop is concerned, the higher rainfall in the southern sections during July, August and September would more than compensate for the somewhat higher temperature, while the lower rainfall of October in all sections is favorable to the ripening and harvesting of the crop. The temperature of the winter months in the central and southern sections is favorable to continuing the manufacture of sugar after the beets are harvested.

CLIMATIC CONDITIONS DURING 1897.

The temperature during April, May and June was considerably below the average, while for July, September and October it was above the average. The temperature for October in every part of the State was the highest ever recorded for that month. The temperature during August was slightly below the average. The cold spring and high rainfall in June were unfavorable for planting and cultivating the beet crop. The rainfall during July, August, September and October was below the average, and tended to reduce the size of the beets. The rainfall during November was the highest ever recorded for the month. But, owing to the low temperature, very little second growth of the beets took place.

Altogether, the season may be considered to have been of unusual character and rather unfavorable to the crop. In the northern part of the State, on the recently reclaimed land, the level of the ground water was high enough to permit of a continuous growth of the beets during the protracted drouth.

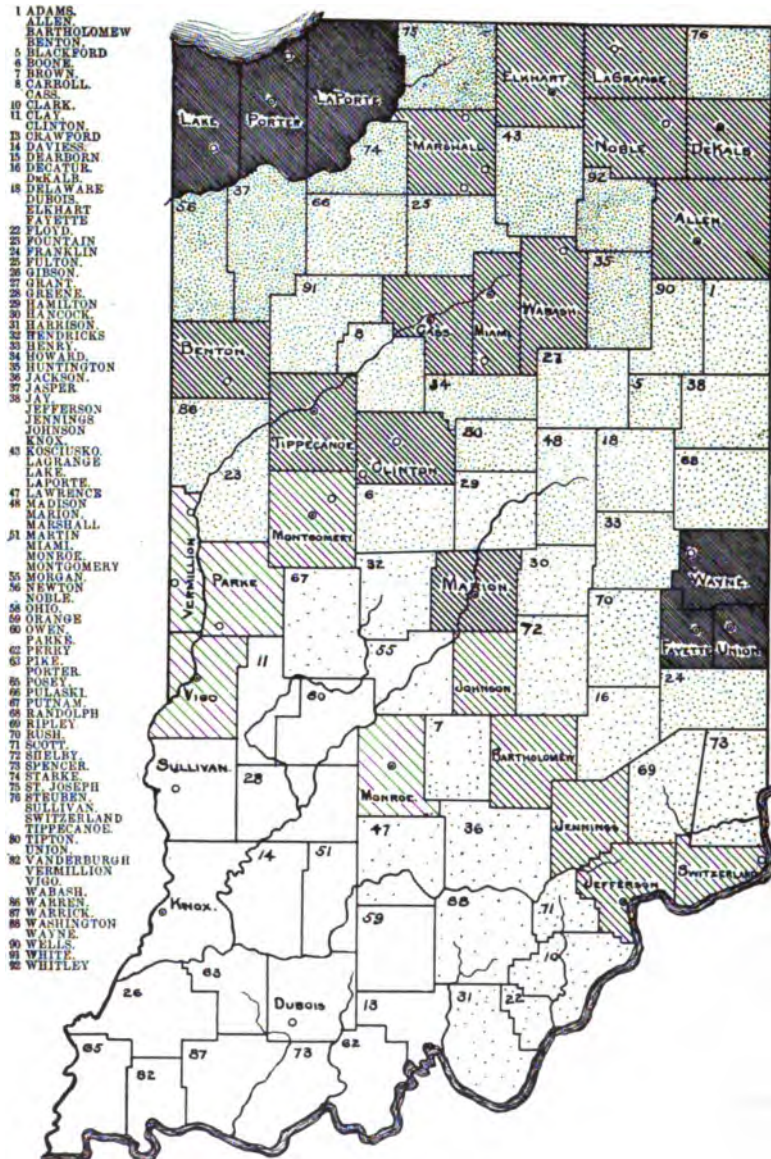


FIG. 2—ISOOTHERMS FOR JUNE, JULY AND AUGUST IN INDIANA.

SOIL.

Moderately light, sandy loam is the soil generally considered best for beets. Heavy clay soils are not recommended on account of the cost of working the land, the difficulty of the tap root penetrating the subsoil and the low tonnage usually produced. Muck lands produce badly formed beets that seldom ripen well and contain a low percentage of sugar and a very impure juice. Prairie lands that have been under cultivation for some years will produce good beets if proper methods are followed. Bottom lands that do not overflow have produced very good beets. On all beet lands, good drainage is necessary if beets of good form are to be produced.

If the land is thought to be in need of manure, it is best to apply a heavy dressing of manure to the previous crop, the corn crop, for example, rather than apply it to the beet crop. Where this is impracticable, the manure should be applied and plowed under in the fall. If a heavy dressing of manure is applied in the spring, the beets are likely to make a very rank growth and to have a low sugar content and impure juice.

If commercial fertilizers are to be used, those containing phosphoric acid and nitrogen are most likely to be generally useful. On light, sandy soils, the addition of potash compounds would probably be profitable. The phosphoric acid should be in a readily available form, such as that derived from dissolved bone black, genuine dissolved bone or from dissolved rock. Nitrate of soda furnishes a very desirable form of nitrogen, although nitrogen in packing house side products would probably be used to advantage.

The amount of fertilizer to be applied must depend on the richness of the ground. Too large an application of nitrogen compounds in the presence of plenty of phosphoric acid, potash and lime would tend to produce rank, impure beets. While the beet takes up relatively large amounts of plant food, the crop is not necessarily an exhausting one, since a comparatively large part of this plant food is contained in the leaves and crown of the beet. These parts are removed before the beets go to the factory, and may be converted into manure.

METHOD OF RAISING BEETS.

Seed.—The first essential is the securing of good seed. The modern sugar beet is the result of careful selection and breeding, and has the same tendency to degenerate that is shown by all highly bred organisms. The production of high-grade beet seed is a distinct business from the production of commercial beets. Comparatively little high-grade beet seed has been produced in the United States. But the results so far obtained in its produced here indicate that there will be no difficulty in producing satisfactory seed when the market shall require it. At present most American beets are raised from foreign seed.

Plowing.—It is of the highest importance that the land intended for beet raising should be plowed deeply enough to permit the beet to develop its normal shape and still not protrude above the ground. The soil should be loosened to a depth of not less than fifteen inches. The best way to accomplish this is to plow the land to the usual depth, six to eight inches, and follow the plow with a subsoil plow that will stir the soil eight or ten inches deeper. There are several types of subsoil plows that will answer the purpose. The one in use at the Station is shown in Fig. 3. These subsoil plows do not bring a heavy layer of raw subsoil to the surface, but



FIG. 3—SUBSOIL PLOW.

leave the subsoil in place, yet in such condition that it is readily penetrated by air and water. The tap root of the beet can then easily make its downward growth.

This deep bed of loose soil also acts as a reservoir to take up water falling on the ground and retains it for the use of the crop during a dry season. Whenever practicable, this plowing should take place in the fall. Subsoiled lands take up and hold such great quantities of water that there is little danger of surface washing.

The purpose of this deep plowing of the land is to permit the beet to develop its normal size and shape without extending above the ground. All that part of the beet which is above the level of the ground is worthless for sugar making purposes, and must be removed before taking the beet to the factory. When beets are properly raised, the loss in capping is small; but where beets extend above the ground the loss may represent more than half of the total weight of the crop.

Figs. 4 and 5 represent beets properly raised and the position of the knife in Fig. 5 shows where the cap is removed (at the base of the outside leaf). These figures illustrate the elongated form of the beet; but they were harvested in the ordinary way and do not show all of the tap root. Fig. 6 shows beets grown on the same land and illustrates the great length of the tap root. These roots were followed until they entered a very hard cement layer about three feet from the surface. They extended into this layer, but the cement layer at harvest time was so hard that it was impossible to remove the delicate tap root from it. Figs. 7, 8 and 9 show beets that did not have conditions permitting a normal development of the root

under ground. The part above the knife shows how great a loss is occasioned by such conditions. Fig. 12 shows beets of which the tap root has been injured. At a later period of growth, several roots have been sent down. This effect is often produced by transplanting. Figs. 11 and 13 show the effect of a very compact subsoil in restricting the thickness of the root after it penetrates the hard layer.



FIG. 4—WELL FORMED BEET.

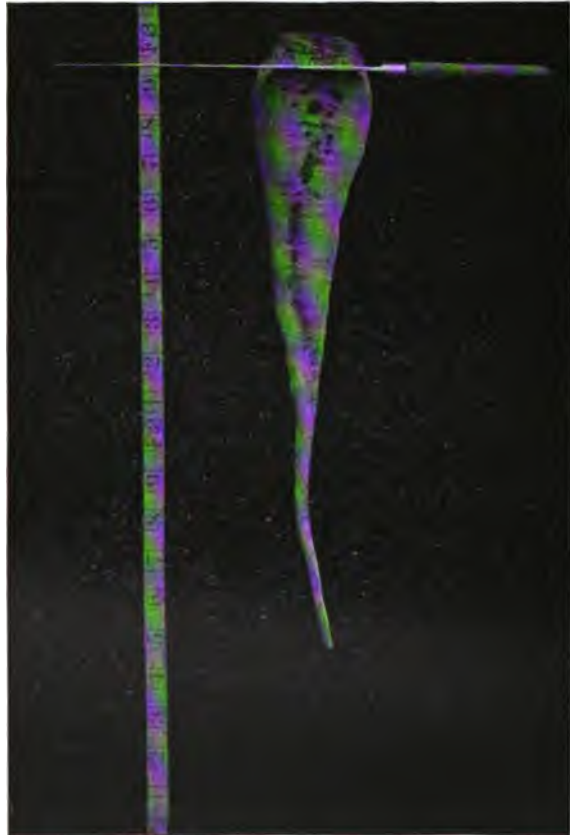


FIG. 5—PLACE FOR CAPPING PROPERLY RAISED BEET.

The losses shown in Figs. 7 to 11 can be avoided by subsolling and proper preparation of the seed bed.

During the ten years that we have been conducting experimental work on the sugar beet, the greatest difficulty has been experienced in getting any considerable number of farmers to properly prepare the land. Fre-



FIG. 6—ROOT SYSTEM.

quently no subsoil plow was available, and the experimenters did not fully appreciate the necessity of this part of the work. One of the most frequent errors is to think that sandy subsoils do not require subsoiling. Extended experience on the sandy land of northern Indiana shows that subsoiling for root crops on sandy land is always desirable and profitable, and in unfavorable years it is essential.



FIG. 7—LOSS IN CAPPING IMPROPERLY RAISED BEET.

Seeding.—If the land has been plowed in the fall it should be deeply harrowed in the spring, and a thoroughly prepared seed bed should be made as early as the condition of the ground will permit. A plank drag

will give a smooth surface that will aid in the planting. The soil at planting time should have a temperature of about 50 degrees. The rows should not be more than 24 inches apart, and on rich land they should be nearer together. A good rule on rich land is to put the rows as near together as possible and permit the use of a small horse in cultivation. The seed is drilled in with any good hand drill. From ten to fifteen pounds per acre should be used. Most hand drills have a scale on them, showing where to set them for various kinds of seed. In drilling sugar beet seed, the drill should be set to deliver more seed than is indicated by the point marked "beet" on these drills. The amount of seed used gives far more plants than can be raised on an acre; but experience has shown



FIG. 8—LOSS IN CAPPING IMPROPERLY RAISED BEET.

that it is cheaper to use an abundant supply of seed and cut out the surplus plants than to try to correct a defective stand by replanting. The seed should be planted from one to one and one-half inches deep.

The natural time of planting is between the time of sowing oats and planting corn.

Cultivation and Thinning.—Cultivation should begin a few days after the seed is planted and before the plants show above the ground. If the surface of the ground be worked with a very light harrow or some tool like a Breed's weeder, great numbers of weeds will be killed and the surface will be kept loose. This loose surface will be found a very great

advantage when the first cultivation along the rows is undertaken. After the plants are up, the ground should be given flat cultivation to keep down weeds until the plants have developed four leaves. At this time the plants should be thinned out until they average from six to eight inches apart in the rows. In doing this, care should be taken to leave the strongest plants and to leave only single plants. The purpose of the narrow rows and



FIG. 9—LOSS IN CAPPING IMPROPERLY RAISED BEET.

the short distance between the plants is to control the size of the beets. The beets should weigh from one to two pounds each. Do not try to produce larger beets, for they contain a lower percentage of sugar and a high amount of impurities. Many factories refuse to receive beets weighing over four pounds each. Fig. 10 illustrates this fact, although the largest beets here are well within the factory limit as to size.

When beets are thinned care should be taken to remove all weeds in the rows. After the thinning the beets should be cultivated often enough

to keep a thin layer of loose earth between rows and to keep down weeds until the beet leaves nearly cover the ground. If the ground has been well prepared and subsoiled, it is seldom necessary to ridge up the earth along the rows. But if the crowns of the beets show a tendency to extend above the ground the earth may be thrown toward the rows at the last cultivation.

The only insect that is likely to do serious injury to the beet is the blister beetle. This may be killed with Paris green.

If the leaf spot disease attacks the plants, they should be sprayed with Bordeaux mixture.

Harvesting.—In this State the beets are usually ready for harvest in October, if the season is a fair one. Since the plants develop sugar very rapidly during the ripening period, care should be taken not to harvest before the crop is ripe. The signs of ripening are that the leaves turn from a dark green to a yellowish green and the outside leaves fall to the ground. The outside leaves may fall during a dry time, but in this case the remaining leaves keep their dark color. Beets are not injured by even quite a severe frost, so that there is no danger from frost in leaving the crop in the ground in an ordinary year until the end of November. On experimental plats it would be well to leave at least a part of the beets in the ground, until the results of the analysis of the beets have been received, as it may be desirable to send another sample.

If a deep furrow be plowed as closely as possible to the row, the beets can be readily removed from the ground. This is better than to try to turn the beets out with a plow, as in the latter case a considerable loss results from breaking off the lower portion of the root.

Where beets are sold to a factory, the crown of the beet is removed, the cut being made at the base of the outside leaf, as shown in Fig. 5, or if the beets have projected above the ground all that part which grew above the ground is removed. (See Fig. 7.) Where beets are to be fed, the tops only are removed.

Cost of Production.—Various estimates of the cost of producing an acre of beets have been made. This cost will vary with the season, the kind of soil and the skill with which the grower manages his crop. On suitable land, with a fair season, the cost will fall between \$25 and \$35 per acre. This includes all items excepting commercial fertilizers, which are little used in the part of the State best suited for beet culture.

One of the most costly, and to most farmers the most objectionable feature of the work, is the great amount of hand labor required in thinning and harvesting the beets. Wherever American factories have been established, a contract system of tending and harvesting the beets has been introduced. The farmer prepares the land and sows the seed. From this time until the crop is loaded on wagons, ready to be delivered to the factory, a contractor who employs a large number of men and boys takes charge of all the work at a fixed price per ton. This contractor's

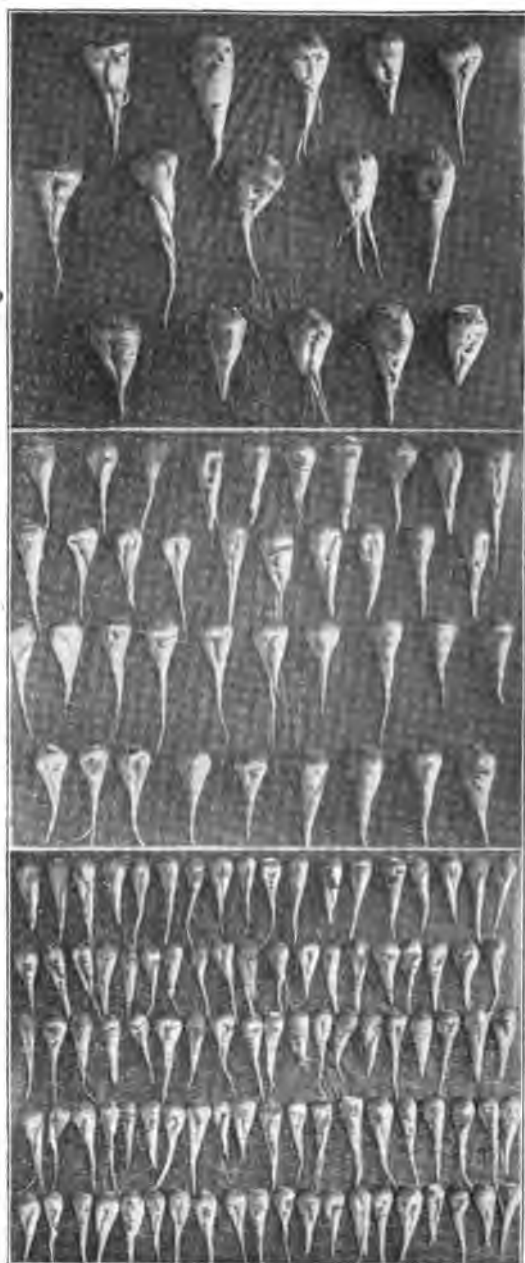


FIG. 10.

15 large beets, weight 40 lbs., contain 4 lbs., 4 oz. of sugar.
39 medium beets, weight 40 lbs., contain 4 lbs., 14 oz. of sugar.
96 small beets, weight 40 lbs., contain 5 lbs., 10 oz. of sugar.

work is subject to the inspection of the field superintendent employed by the factory. Where farmers do not wish to do their own work, the contract system affords a relief from the most troublesome part of it at a moderate



FIG. 11—EFFECT OF TOO HARD SUBSOIL.

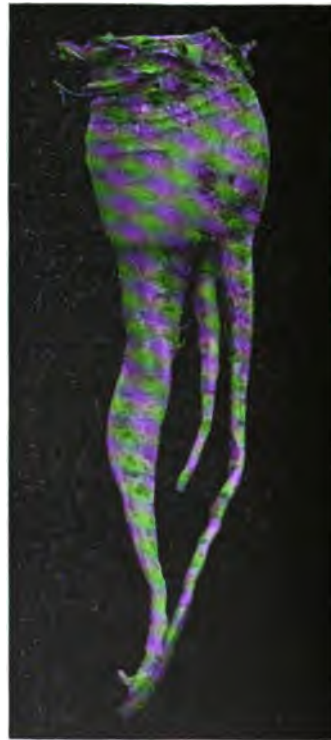


FIG. 13—EFFECT OF TOO HARD SUBSOIL.

rate, and under conditions that afford assurance that careful work will be done.

Very many special tools have been devised for almost every operation from seeding to digging the beets. For experimental work, the only

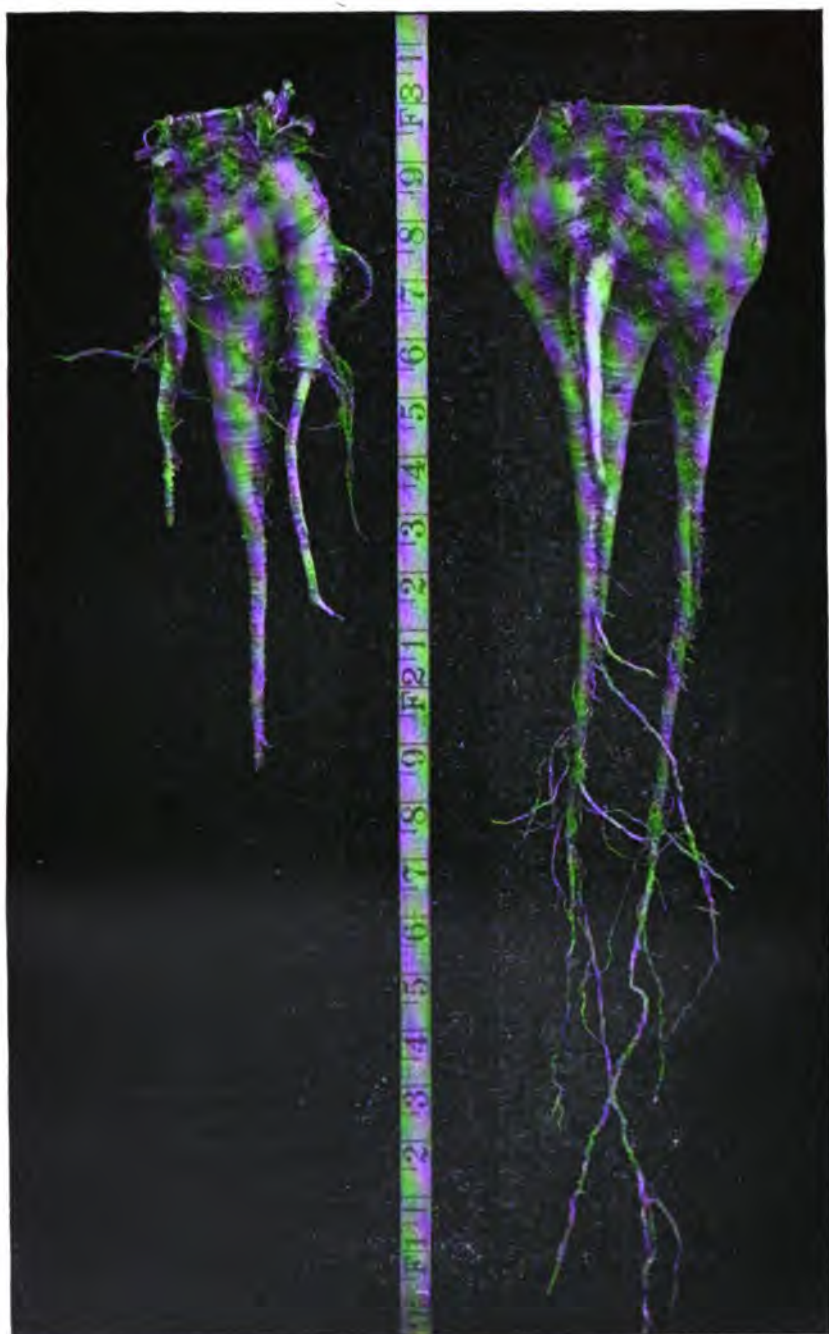


FIG. 12—EFFECT OF BAD SUBSOIL.

essential ones are a subsoil plow and some form of garden drill. One of each may supply the need of a number of experimenters, and both are implements that can be used to good purpose for other crops.

IMPORTANCE OF CORRECT METHODS OF WORK.

The purpose of raising experimental lots of beets is to learn whether beets satisfactory in quality and yield can be produced at a profit, and to become familiar enough with the work to form an opinion whether one would wish to raise them on a commercial scale if the opportunity should be offered. When factories make contracts for beets the contract specifies that the beets shall be raised in essentially the manner described above, and shall come to a certain standard in quality and size. If one is to get reliable knowledge from his experimental work, it follows that the work must be properly done in every respect. If such methods are followed that beets of poor quality are produced, the work is not only lost but much actual damage may result to the locality. For before any one who is likely to succeed in the business of manufacturing beet sugar will consider a proposition to erect a factory in any locality he must know whether beets of satisfactory quality can be produced there, and whether the farmers are willing to produce them at the customary price, which is generally from \$4.00 to \$5.00 per ton. Now, suppose that owing to bad methods of work on the experimental plats beets of poor quality have been produced. The prospective investor sees the report of these beets and concludes that good beets can not be produced there.

No inducements in the shape of a bonus can induce a reliable investor to build a beet factory in such a locality. Many places in the State that are probably well adapted to beet culture already have a bad showing solely on account of failure to follow correct methods of work.

LARGE FACTORIES NECESSARY.

The condition of the American sugar market is such that the sugar should leave the factory ready for the consumer. To make such sugar, a very complete plant is required. It must be large enough to permit of every economy in the matter of labor and fuel. Such a plant would cost not less than \$250,000, and several of the American plants have cost far more than this. Such a plant should work up not less than 30,000 tons of beets in 120 days. To produce these beets and provide for the proper rotation of crops, not less than 10,000 acres of beet land should be within hauling distance of the factory. For wagons, this distance would not exceed eight miles, and for railroads it should not exceed fifty miles. Beets could be shipped by rail from ten to fifty miles at one cent per ton per mile.

Before beet sugar is fit for consumption, it must be refined. The flavor of raw or brown beet sugar is so objectionable that the only buyer of it would be a sugar refiner. For this reason, the small home mill, such as is sometimes used for cane or sorghum, is entirely unsuitable for the production of beet sugar.

YIELDS AND RETURNS.

The yields in localities where beets are produced on a commercial scale range from 6 to 20 tons or more per acre; 8 tons is considered a low yield. The average yield is probably between 12 and 13 tons. The natural conditions in Indiana would tend to produce a higher yield than those of the localities where factories are now in operation.

Farmers who are familiar with the production of beets on a commercial scale believe that, on the average, beets can be produced and delivered for \$2.50 per ton. If 12 tons per acre are produced, the cost is \$30.00 per acre, and the return, at \$4.00 per ton, the lowest price paid for beets of satisfactory quality, is \$48.00 per acre. Much larger yields are often obtained. But on the basis of the lowest price and the average yield the return per acre is better than the average return for our ordinary field crops. Moreover, the crop is contacted for before it is planted, and the farmer knows the price that he is to receive. The terms of the contracts vary somewhat in different places, but two general kinds of contracts are in use. In one, the farmer is given a flat price per ton for all beets below four pounds in weight that have a sugar content of 12 per cent. and a purity of 80; in the other, he is paid according to the sugar content and purity. The flat price per ton seems to find most favor among the growers.

FACTORY REQUIREMENTS.

A factory requires 300 tons or more of beets per day during the working season. To manufacture them into sugar, large supplies of fuel, limestone and pure water are necessary. Good transportation facilities are required for bringing in the supplies and for marketing the product.

In respect of all these, Indiana is favorably located. It remains for our farmers to demonstrate that they can and will produce the necessary supply of beets.

It would require 150 large factories to produce the sugar which we now import, and for which we send abroad \$100,000,000 per year in gold. If we produced the sugar, we would have the sugar and the gold both.

EFFECT ON LAND VALUES.

The land which is now used to produce beets for the factories had a value of from \$10.00 to \$25.00 per acre before the factories were erected. The rents now paid for such lands indicate that these lands are now

valued at \$100 to \$200 per acre. The distribution of from \$100,000 to \$300,000 in cash for beets means much to the community.

A moderate sized factory would employ about 200 men.

SIDE PRODUCE.

The pulp that is left after the sugar is extracted is found to be an excellent food for beef and dairy cattle and for sheep. Large numbers of such animals are fed at or near the factories, either by farmers who buy the pulp or by the factories themselves. The pulp can be placed in silos and kept for a long time, as the hot water treatment to which it has been subjected practically sterilizes it and it is much less liable to destructive fermentation than ordinary green crops.

RESULTS OF EXPERIMENTS IN INDIANA.

The record of the sugar beet work conducted in Indiana for the past ten years has already been published in the Station bulletins. Most of these bulletins are now out of print. In general it may be said that in every section of the State beets of satisfactory character have been produced. It is true that many samples of unsatisfactory beets have been produced. But these were the result of improper methods, unsuitable soil, bad seed, or too early harvest.

TABLE II. ANALYSES OF INDIANA SUGAR BEETS, 1897.

NAME.	Post Offic.	Variety.	Average Weisht. Ounces.	Per Cent. Sugar in Juice.	Purity.	Soil.	Tons per Acre.	Cultivation.	Date of Planting.	Date of Harvest.
R. M. Douthett . .	Lake Co.		b	51.4	8.3	66.	Black sandy loam.	c	May 11	Nov. 3
Ernest J. Pouton . .	Highland.									
Martin Nichols . .	Porter Co.									
	Kout.	Mangels (?)	b	9.6	10.4	82.5	Black sand.	c	June 1	Oct. 15
	Hebron.		b	14.5	17.0	86.4	Dark sandy.	b	May 11	Nov. 13
Prison	Laporte Co.		b	21.7	9.0	64.3	Sandy.		July 1-7	
	Michigan City.									
	St. Joseph Co.									
Isaac Reamer . . .	North Liberty.		a	23.5	10.0	83.2	Black sandy loam.	c	May 24	Oct. 19
S. B. Perley . . .	South Bend.	Kleinwansleben	a	22.4	15.9	77.9	Sandy loam.	b	May 5	Oct. 10
"	"	"	a	8.7	14.0	83.3	Clay.	b	May 5	Oct. 10
"	"	"	a	31.3	13.7	86.1	Marsh.	b	May 15	Oct. 10
W. B. Shimp . . .	New Carlisle.	"	a	23.1	12.8	90.1	Sandy loam.	b	Apr. 28	Oct. 22
John A. Kousen . .	South Bend.	"	a	32.4	11.5	76.6	Marsh loam, sand.	c	June 1	Nov. 6
	Elkhart Co.									
E. F. Mannibg. . .	Elkhart.	"	a	10.2	16.0	80.4	Light sandy loam.	b	May 11	Oct. 2
John Manning . .	"	"	a	18.0	12.2	83.9	Black sandy loam.	b	May 7	Oct. 6
Henry Evans . . .	"	"	a	5.6	17.3	83.2	Sandy.	c	Apr. 1	
W. T. Graham . . .	Nappanee.		b	15.1	7.0	63.6	Muck.	c		
W. H. Ames . . .	Elkhart.	Kleinwansleben	a	16.6	17.3	86.3	Light sandy.	b	May 10	Oct. 20
John Banks	"	"	a	8.6	17.0	91.9	Sandy.	c	Apr. 30	Oct. 28
	"	"	a	13.1	17.6	84.1	Sandy loam.	b	Apr. 30	Nov. 6
Eugene Dickinson	Lagrange Co.		b	12.4	16.6	87.4	Gravelly.	a	May 20	Oct. 15
	Wolcottville.									
Jacob Keller . . .	Starke Co.	"	a	20.6	11.5	79.8				
"	North Judson.	"	a	17.7	14.7	85.9				
J. M. Wilson . . .	"	"	a	12.0	15.6	93.4				

TABLE II. ANALYSES OF INDIANA SUGAR BEETS, 1897—Continued.

NAME.	Post Office.	Variety.	Average Weight, Ounces.	Per Cent. Sugar in Juice.	Purity.	Soil.	Tons per Acre.	Cultivation.	Date of Planting.	Date of Harvest.
F. M. Trissal. . . .	Starke Co. San Pierre, North Judson.	Vilmorin Kleinwansleben	11.9 23.4	12.0 12.2	82.3 87.1	Black sandy loam. Sandy.			May 10 May 11	Sept. 30 Oct. 13
J. M. Wilson. . . .	"	"	12.6	14.9	86.7	"		a		Oct. 14
H. A. Ellingson. . .	Hamlet.	"	15.0	15.8	83.4	"		a		Oct. 20
J. A. Bell.	"	"	13.6	13.8	79.3	"		a		Oct. 16
Abe Hineline. . . .	Bass.	"	17.8	12.2	81.3	H'vy yel. and bl'ok sand.		a	May 25	Oct. 21
Henry Gearstadt. . .	North Judson.	"	21.0	13.0	81.3	Heavy yellow sand.		a	May 26	Oct. 21
J. M. Wilson. . . .	"	"	9.9	16.7	88.5	"		a		Oct. 22
F. M. Trissal. . . .	"	"	7.5	11.0	77.7	"		a		Oct. 25
M. Boryanack. . . .	"	"	6.8	10.2	80.9	Sandy marsh.	16.4	b	June 6	Oct. 25
J. M. Wilson. . . .	"	"	19.4	15.3	77.6	Black sandy loam, Sand	12.3	b	May 8	Oct. 13
C. J. Danielson. . .	Hamlet.	"	10.8	17.1	82.3	Sandy loam.	16.8	b	May 11	Oct. 20
Henry Gearstadt. . .	North Judson.	"	11.2	15.4	92.2	Medium sandy.	14.0	a	May 11	Oct. 21
John Furch.	Hamlet.	"	10.5	17.8	86.4	Black loam.		a	May 4	Oct. 21
H. Handerly.	"	"	11.7	16.1	84.7	Sandy.		a	June 10	Oct. 22
J. A. Bell.	"	"	13.5	13.3	83.6	Sandy loam.	85.	c	Apr. 28	Oct. 25
Lieben Liebens. . . .	"	"	9.8	13.6	87.3	Black loam.	34.	b	May 3	Oct. 25
H. A. Ellingson. . .	"	"	12.9	18.0	90.0	Dark sandy loam.	13.9	a	May 8	Nov. 1
J. R. Trissal. . . .	North Judson.	Vilmorin	9.9	13.0	85.9	Black sandy loam.		a	June 12	Nov. 4
"	"	Kleinwansleben	11.7	11.0	86.9	High sandy.		a	June 6	Nov. 4
C. J. Danielson. . .	Hamlet.	"	11.9	10.0	81.9	Black muck.		b	June 6	Nov. 4
Henry Gearstadt. . .	North Judson.	"	21.7	15.8	78.6	"		b	May 11	Nov. 9
Abe Hineline. . . .	"	"	18.1	16.3	88.6	Sandy.	17.1	b		
"	"	"	20.3	14.9	89.9	"		b		
C. J. Goodell. . . .	Newton Co. Morocco.	"	10.5	13.7	96.4	Sandy loam and sand.	8.9	a	Apr. 17	Oct. 19
Jasper Co.	"	"								
Frank Ceroop. . . .	Kinman.	"	2.1	17.9	84.4					

Allen Co.	Kleinwanslebener	10.3	12.9	84.9	Black sandy.	b	May 7	
Fort Wayne.	"	16.8	14.1	80.3	Hard sand black.	c	May 30	
"	"	14.3	14.3	81.2				
Goggin.	"	23.5	12.1	80.7				
"	"	41.9	10.0	76.9	Clay.	a	May 20	Oct. 1
Fort Wayne.	"	14.3	16.7	81.8				
"	"	25.7	12.4	72.8				
"	"	17.5	14.3	84.6	Black loam.	b	May 22	Oct. 7
"	"	10.0	14.3	83.1				
Hogland.	"	24.5	11.3	79.6	Black sandy loam.	b	May 1	Oct. 9
New Haven.	"	34.0	15.3	83.2	Black sandy loam.	b	May 20	
Fort Wayne.	"	34.4	10.3	81.1	Black sand.	b		
Hicksville, Ohio.	"	30.5	14.3	91.3				
Fort Wayne.	"	17.5	13.6	91.3				
Hogland.	"	23.3	12.0	84.5				
Fort Wayne.	"	12.3	14.0	88.6	Sandy clay.	b	May 22	Oct. 29
Wallen.	"	16.8	16.5	80.9	Light clay.	h	May 15	Nov. 12
Gar Creek.	"	39.6	13.4	72.1	Sandy loam.	h	May 15	Nov. 12
Fort Wayne.	"	26.2	15.0	86.2	Black sandy.	c	June 3	Nov. 9
Fort Wayne.	Vilmorin, Imp	26.6	14.3	87.0		c	June 3	Nov. 9
"	Pink top	23.0	10.1	70.1				
Benton Co.								
Lafayette.	Kleinwanslebener	17.3	10.3	78.5	Prairie black loam.	c	May 26	Oct. 31
"	"	33.9	12.4	84.9		c	May 26	
"	"	42.1	11.0	76.3		c	May 26	
White Co.								
Wolcott.	b	20.4	10.3	66	Black sandy loam.	b	May 3	Oct. 25
Osas Co.								
Logansport.	b	23.7	12.0	76.9				
W. H. Holton	h	27.6	13.7	83.5				
W. S. Wright.	h	12.9	9.8	70	Clay.	c	June 1	Nov. 10
Young America.	b	6.6	12.3	78.5	"	b	June 1	Nov. 10
Wabash Co.								
North Manchester.	b	6.1	15.7	85.3				
"	b	18.9	11.3	74.3				
"	b	18.9	4.6	51.1				
"	b	12.0	13.8	77.1				
Huntington Co.								
Huntington.	b	16.8	10.5	76.6	Sandy loam, gravel.			
"	b	23.4	9.1	68.1	Heavy clay.			
"	b	31.1	11.1	78.3	Clay loam.			
"	b	32.9	11.2	82.9	Black prairie.			
"	b	47.3	10.0	70.6	Black muck.			
Lagro.	b							

TABLE II. ANALYSES OF INDIANA SUGAR BEETS, 1897—Continued.

NAME.	Post Office.	Variety.	Average Weight. (Pounds.)	Per Cent. Sugar in Juice.	Purity.	Soil.	Tons per Acre.	Cultivation.	Date of Planting.	Date of Harvest.
S. H. Williams . .	Huntington Co.		26.2	12.0	84.5	Clay.				
R. B. Kance . . .	Rock Creek Center.		14.0	9.0	54.6	Sandy.				
Simon Diner . . .	Huntington.		44.0	10.2	78.1	Black sandy.				
I. U. Wansley . .	"		24.2	11.2	73.7	Sandy loam.				
John M. Rogers . .	Mt. Etas.		20.4	13.2	73.5	Yellow clay.				
G. W. Williams . .	Huntington.		14.8	12.0	81.3	Black loam.				
H. A. Morrow . .	"		20.8	12.1	85.2	Clay.				
M. G. Hiebart . .	"		21.8	12.7	83.0	Sandy.				
D. Vinsling . . .	"		15.6	12.8	83.6	Dark prairie.				
I. B. Miller . . .	"		21.0	12.2	79.0	Black, not loamy.				
T. W. Shanks . .	"		17.8	12.2	82.1	Clay, little sand.				
W. W. Hawley . .	"		14.5	15.3	82.1					
William Miller . .	"		20.2	13.6	73.6					
W. W. Hawley . .	"		10.5	11.0	74.8	Sandy.				
F. C. Fleming . . .	Warren Co.		18.2	12.2	83.0					
J. R. Robinson . .	West Lebanon.									
Henry Meigs . . .	Tippecanoe Co.		20.6	13.8	92.6	Clay.	15.5	b	May 17	Oct. 15
Experimental Sta.	Battle Ground.		13.3	12.0	74.9	Black loam.	7.6	b	May 26	Oct. 22
"	Romney.	Kleinwanslebener a	7.5	14.5	85.0	"	4.0	a	May 5	Nov. 13
"	West Lafayette.	b. g. Kleinwanslebener a	11.0	14.5	85.0	"	4.2	a	May 5	Nov. 13
"	"	Vilmorin, Imp. a	13.0	10.8	82.3	"	15.6	a	May 5	Nov. 13
"	"	Kleinwanslebener a	13.0	10.8	87.1	"	13.2	a	May 5	Nov. 13
"	"	L. D.	3.4	13.3	84.4	"	8.2	a	Apr. 23	Nov. 13
"	"	D. D.	3.2	13.3	84.4	"	8.2	a	Apr. 23	Nov. 13
George Martteller .	New Richmond.	Lane's Imperial b	30.2	17.3	84.0	"	12.0	c	May 20	Nov. 15
Experimental Sta.	West Lafayette.	Vilmorin spe.	4.0	16.1	81.3	"				
"	"	Domesmay "	8.0	16.1	81.3	"				
"	"	Kleinwanslebener "	6.0	20.1	79.1	"				
"	"		8.0	19.4	83.6	"				

TABLE II. ANALYSES OF INDIANA SUGAR BEETS, 1897—Continued.

NAME.	Post Office.	Variety.	Average Weight. Ounces.	Per Cent. Sugar in Juice.	Purity.	Soil.	Tons per Acre.	Cultivation.	Date of Planting.	Date of Harvest.
Jas. W. Hindley . . . J. J. Lorton . . . J. B. Sutton . . .	Randolph Co. Castle. . Castle.	Kleinwanzlebener a Kleinwanzlebener c	175 13.1 192 13.8 34.5 11.8	82.4 83.1 71.5		Black clay loam. Black sticky muck. Light red.	15.1 8. 6.	c c b	May 15 June 1	Oct. 14 Oct. 16
John Campbell . .	Parke Co.	"	b 7.8	10.2	54.7	Upland clay.	3.7	a	May 25	
J. G. Kingsbury . .	Marion Co. Irrington.	"	a 17.1	12.7	83.5	Upland clay.			May 15	Oct. 26
J. L. Mothershead " . . " . .	Hancock Co. Fortville. " . . "	" . . " . . " . . "	a 27.5 14.2 a 36.2 12.0 a 18.5 15.0 a 9.6 14.7	93.4 77.9 83.2 90.2		Clay.	10.1	a	May 14	Oct. 20
John Parker . . . A. D. Ogden . . . S. P. Jennings . . I. B. Gilbert . . . J. J. Pickering . . A. M. Coffin . . . John S. Lowry . . . Jesse Pordon . . . E. Pleas . . . W. S. Moffett . . . John Parker . . . John Parker . . .	Henry Co. Lewisville. New Castle. " . . " . . Spiceland. New Castle. Spiceland. Dunreith. Greensboro. Lewisville.	" . . " . . " . . " . . " . . " . . Vilmoria Yellow beets Kleinwanzlebener b	b 13.3 15.4 b 12.4 15.6 b 4.7 7.9 b 8.0 12.5 b 6.1 14.3 b 17.5 13.0 b 35.1 14.2 b 20.1 16.0 b 33.1 4.8 b 69.1 12.5 b 3.5 15.0 b 6.5 15.1	87.7 80.5 58.8 79.9 77.3 80.2 79.3 82.9 64.3 77.1 86.7 89.8		Black loam. Sandy bottom. Clay. Black loam. Bottom land. Black. Clay loam. Clay loam. Clay. Black loam.	13.2 13.2 b b b 12.3 14.4 14. 15.0	b c b c c b b c	May 17 May 31 June 1 June 5 June 1 May 15 May 15 May 15	Oct. 17 Oct. 17 Nov. 3 Nov. 3 Nov. 3 Nov. 3 Nov. 3 Nov. 3
Walter J. Quick . . . " . . " . .	Morgan Co. Brooklyn. " . . "	" . . Vilmoria, imp. Kleinwanzlebener c	a 9.4 a 18.2 a 15.5	13.3 14.5 14.8	78.8 84.9 84.8	Sandy loam. Sandy loam. Sandy loam.	19.8 13.3	c b b	June 9 June 9 June 9	Sept. 25 Nov. 11 Nov. 11

[illegible]

The results so far obtained indicate that it is highly probable that Indiana can produce enough beets of satisfactory quality to furnish the raw material for a large number of factories.

RESULTS IN 1897.

The analyses of all samples received in 1897 appear in Table II.

The percentage of sugar in the juice is given in the table; and not the percentage of sugar in the beet, because this is the form in which the actual laboratory results are obtained and because it is the usual form of making such reports.

The percentage of sugar in the beet may be obtained by multiplying the percentage of sugar in the juice by 0.95. The number in the column headed "purity" indicates the percentage of the total solid matter in the juice which consists of sugar. Thus a purity of 80 means that of every 100 pounds of solid matter dissolved in the juice 80 pounds consists of sugar and 20 pounds of other substances. The higher the amount of sugar and the lower the amount of the other substances, the better the beet is for sugar making purposes. The juice densities were taken with a Westphal balance, not with a spindle.

Under the head of cultivation "a" means that proper methods were used so far as appears in the reports; "b" means that in one or more respects proper methods were not followed; "c" means unsatisfactory method in nearly every respect.

The seed sent out by the Station was furnished by the honorable Secretary of Agriculture. Under the head of variety, the letter "a" indicates this seed or some known to be equally good; the letter "b" indicates that seed not positively known to be satisfactory.

At the time the seed was sent out, it seemed possible that beet growers might be asked to accept \$3.25 per ton for beets. The blank forms contained a request that the party sending the beets would state whether from the results of the season's work he believed that he could produce beets at a profit, if he received \$3.25 per ton for his crop; 69 replies were received; 43 parties believed that the best crop could yield a profit at \$3.25; 19 believed that it would not, and seven gave a profitable price at from \$3.75 to \$5.00.

The tonnage is calculated from the reports sent in and means the net ton of capped beets per acre. The allowance for capping and earth was made from the results of the washing and capping of the samples received.

The tabulated results show that in every county in the list from which more than one sample was received beets of satisfactory character have been produced; and this in spite of the fact that in very many cases the

work was not conducted under the proper conditions. Many samples were received from parties who did not get the seed from the Station, and who stated that they had no knowledge of the proper methods of raising beets.

In view of these results, it seems very desirable to conduct further tests under better culture conditions. The Station has received a considerable quantity of seed from the Secretary of Agriculture, and will probably have seed from other sources at its disposal. This seed will be sent free of charge to those who will agree to carry out the instructions for proper work as fully as practicable, to keep a record of the work, and to send samples of the beets when called for. Large areas are not needed. One-quarter or one-eighth of an acre is enough to give a fair idea of the work, and is probably as much as the current work on most farms will make it convenient to care for.

The beets raised are most excellent feed for dairy or beef cattle, hogs or sheep, and the crop will more than pay its cost if used in this way.

The Station wishes to make as extensive a trial of the matter as practicable, especially in northern and central counties. Many applications for seed are now on file and others will be filed in the order in which they are received.

Those asking for seed are especially requested to state what kind of soil will be used for the work and what area will be planted. We shall probably not be in a position to furnish seed for more than one-fourth of an acre to any one person.

Very frequently we have requests to send a lot of seed to some one person, who will undertake to distribute it. In the past the results of this kind of distribution have been so unsatisfactory that we very much prefer that the list of names be sent directly to us so that our record may be complete and we may send directly for samples at harvest time.

Full directions for the work will be furnished and at harvest time special instructions for forwarding samples will be sent out.

Farmers are especially urged to keep the record of the work on the forms furnished.

What has been accomplished already seems to indicate that, taking everything into consideration, Indiana will be found admirably adapted to the production of the sugar beet, but the fact is not yet proven, and we earnestly request the farmers of the State to co-operate with the Station in the work of making a thorough and reliable test of the matter.

The establishment of a few beet sugar factories in the State would exert a most important and beneficial influence on its agricultural condition. Such factories will only be located here after it is clearly shown that beets of satisfactory character can be produced here and that the farmers are ready to raise them. This is the question that we ask the farmers of the State to assist in solving.

FORMULAS FOR MAKING INSECTICIDES AND FUNGICIDES, AND DIRECTIONS FOR SPRAYING.

JAMES TROOP.

A. FUNGICIDES.

I. BORDEAUX MIXTURE.

Copper sulphate, or blue vitriol.....4 pounds.

Quicklime4 pounds.

Water, to make 50 gallons (an alcohol or coal oil barrel).

Dissolve the copper in hot water, if wanted for immediate use, or place it in an old gunny sack and suspend it in the barrel, two-thirds full of water, until it is all dissolved. Slake the lime, and add water until it is of the consistency of milk, and when cool pour it into the copper solution, using a sieve to remove all coarse material. Stir this mixture and fill the barrel with water; it is then ready for use.

For plants with tender foliage, such as young raspberry canes, only one-half the amount of copper and lime should be used.

II. AMMONIACAL COPPER CARBONATE SOLUTION.

Copper carbonate.....6 ounces.

Strong ammonia3 pints.

Water50 gallons.

Dissolve the copper in the ammonia and add to the water. Copper carbonate is more expensive than the sulphate. To make the carbonate, dissolve ten pounds of copper sulphate in ten gallons of water. Then dissolve twelve pounds of carbonate of soda in ten gallons of water. When cool, mix the two solutions slowly, stirring well. Allow it to stand twelve hours and settle, after which pour off the liquid. Add the same quantity of water as before and let stand twelve hours more. Repeat this process again, after which dry the powder, which is copper carbonate.

III. COPPER SULPHATE SOLUTION.

To be used on plants before the buds begin to swell:

Copper sulphate 4 pounds.
Water 50 gallons.
Mix as for the Bordeaux mixture.

B. INSECTICIDES.

I. PARIS GREEN AND LONDON PURPLE.

Either Paris green or London purple and water should be mixed at the rate of one pound of the powder to 200 gallons of water, or four ounces to a barrel of water. To prevent burning the foliage, add two or three pounds of freshly slaked lime. Paris green or London purple may be combined with Bordeaux mixture, at the rate of one pound of the powder to 200 gallons of Bordeaux, or in these proportions. Stir frequently to prevent settling.

II. KEROSENE EMULSION.

Dissolve one-half pound hard soap in one gallon of soft water (hard water may be used), and while still hot, remove from the stove, and add two gallons of coal oil or kerosene. Force this mixture through a force pump back into the vessel, until it becomes of the consistency of cream. This will require from five to ten minutes. This is the stock solution. When wanted for the hard-bodied insects, such as common scales, etc., use one part emulsion to eight or ten parts of water. For the soft-bodied insects, such as plant lice, etc., use one part emulsion to 15 or 20 parts of water. Use in a fine spray.

III. WHALE-OIL SOAP SOLUTION.

Use two pounds of soap to one gallon of water. See that the soap is thoroughly dissolved, and apply in a fine spray.

IV. WHITE HELLEBORE.

When used as a spray, use one ounce to three gallons of water. It may be used as a powder on currants and gooseberries, when the foliage is damp.

V. PYRETHRUM.

This is the powdered flowers of the pyrethrum plant, and is perfectly harmless to the higher animals, but is very effective as an insecticide. It may be dusted on with a bellows, or applied in solution at the rate of one ounce to two gallons of water. When not in use, keep it in a tight can or box.

C. WHAT, WHEN AND HOW TO SPRAY.

APPLE.

Codling Moth.—Spray just after blossoms fall, with the arsenites in Bordeaux mixture, and at intervals of two weeks for six or eight weeks.

Scab.—Use Bordeaux before the leaf buds open, again just before blossoming and again after the blossoms have fallen. If damp weather prevails, spray again eight or ten days later.

Canker Worm.—Use arsenites in Bordeaux when the young worms first make their appearance, and at intervals of one week if they still remain.

Apple Plant Louse.—Spray with kerosene emulsion as soon as the eggs begin to hatch. Many of the lice will be found on the under side of the leaves.

San Jose Scale.—Spray with the whale oil soap solution just before the leaves start in the spring.

CHERRY.

Aphis, or Green Louse.—Use kerosene emulsion as soon as the aphis make their appearance, using care to reach the under surface of the leaves.

Slug.—Paris green in Bordeaux may be used as soon as the slug appears on the leaves, or air-slaked lime dusted over the tree will prove effectual.

Curculio.—Paris green in Bordeaux used before blossoming will destroy many of them; spray again just after the blossoms have fallen. Supplement the spray with jarring.

San Jose Scale.—Use whale oil soap solution the same as for apple.

GOOSEBERRY.

Currant Worm or Gooseberry Saw-Fly.—Use white hellebore and pyrethrum the same as for currants.

Mildew.—Spray with Bordeaux before the leaves open and again after the blossoms fall.

GRAPE.

Black Rot.—Spray the vines with strong Bordeaux before the buds start, again with a weaker solution before the blossoms appear, and again after the fruit is formed. If necessary to spray after the fruit has begun to color, use ammoniacal copper carbonate solution.

Leaf Hopper.—Spray the vines with kerosene emulsion while the insects are yet young.

Leaf Roller.—Spray with Paris green in Bordeaux and supplement this with gathering and burning all dead leaves.

PEACH.

Leaf Curl.—Spray with Bordeaux just as the buds are swelling, and again after the blossoms fall, using a weaker solution the second time.

Curcullo.—Use arsenites in the Bordeaux after the blossoms fall, and supplement with jarring and destroying all wormy fruit.

PEAR.

Blight.—Spray with strong Bordeaux before the leaves start, and again with weaker solution after blossoms fall. Cut out all affected branches as soon as blight appears.

Scab.—Spray with Bordeaux, as for the apple scab.

Canker Worm.—Use the arsenites with Bordeaux, same as for the apple.

Codling Moth.—Spray with the arsenites (either Paris green or London purple) in Bordeaux, just after the blossoms fall, and at intervals of ten days or two weeks for six or eight weeks.

Slug.—Spray with Paris green in Bordeaux, the same as for the cherry. Air-slaked lime or road dust will answer if applied dry.

Bud Moth.—Use Paris green in Bordeaux just as the buds are opening.

San Jose Scale.—Spray with whale oil soap solution, the same as for the apple.

PLUM.

Curculio.—Spray with Paris green in Bordeaux before the blossoms open, again after blossoms fall. Supplement this with jarring the trees and gathering the insects and burning them. Do this every morning as long as any are found.

Shot-Hole Fungus.—Spray with Bordeaux when the leaves are partially grown and at intervals of two or three weeks for six weeks.

Rot.—Spray with Bordeaux when buds begin to swell, again after blossoms fall and at intervals of three or four weeks until fruit begins to color, then spray once with ammoniacal copper carbonate solution. Gather all mummied plums and destroy them.

San Jose Scale.—Spray with whale oil soap solution, same as for apple.

Black Knot.—Cut out affected branches well back of the disease and burn them.

QUINCE.

Leaf Spot.—Use Bordeaux when the buds are beginning to swell, again after the blossoms fall and at intervals of two weeks for six to eight weeks.

San Jose Scale.—Spray with whale oil soap solution, same as for the apple and pear.

RASPBERRY AND BLACKBERRY.

Anthracnose.—Spray with strong Bordeaux before the leaves open, and after the young canes are well started use a weaker solution, and again a week or ten days later. Confine last spraying to young canes.

Red Rust on Blackberry.—Dig up affected plants and burn them.

STRAWBERRY.

Leaf Roller.—Burn over bed after fruiting.

Leaf Rust.—Spray with Bordeaux as soon as new growth begins, and again before blossoms open.

BEAN.

Anthracnose.—First soak the seed in strong ammoniacal copper carbonate solution for two hours before planting. After plants are three or four inches high, use Bordeaux, and repeat in ten days or two weeks.

BEET.

Leaf Spot.—Spray with Bordeaux when the plants are six inches high, and at intervals of two weeks for four to six weeks.

Blister Beetle.—Spray with Paris green in Bordeaux whenever the insect makes its appearance.

CABBAGE.

Cabbage Worm.—Dust the plants with pyrethrum, or use as a spray, using a tablespoonful to an ordinary water bucket full of water.

Aphis, or Green Louse.—Spray with pyrethrum, same as for the cabbage worm, taking care to reach the under surface of the leaves.

CUCUMBER.

Anthracnose.—Spray with Bordeaux as soon as the plants begin to vine, and at intervals of two weeks for six or eight weeks.

Striped Beetle.—Use Paris green in Bordeaux as soon as it makes its appearance, and as often as necessary.

MUSKMELON.

Leaf Blight.—Spray with Bordeaux when the plants begin to vine, and at intervals of three weeks until their fruit is half grown. The last spraying should be with the ammoniacal copper carbonate solution.

POTATO.

Colorado Beetle.—Spray with Paris green in Bordeaux as soon as they make their appearance, and as often as necessary.

Blister Beetle.—Use Paris green in Bordeaux, same as for the Colorado beetle.

Flea Beetle.—Spray with Paris green in Bordeaux whenever the beetles appear, and repeat if necessary.

Blight.—Spray with Bordeaux as soon as the plants are six or eight inches high, and repeat two or three times at intervals of two weeks.

Scab.—Add eight ounces of formalin to 15 gallons of water and soak the seed tubers in it for two hours before planting.

SQUASH.

Striped Beetle.—Spray as often as necessary with Paris green in Bordeaux, as for the cucumber.

Squash Bug.—Dust the plants with pyrethrum as soon as the bugs appear, and as often as found necessary.

TOMATO.

Anthracnose and Leaf Blight.—Spray with Bordeaux just before blossoming and again just after the first fruit is formed and at intervals of two or three weeks for six or eight weeks.

WATERMELON.

Anthracnose.—Spray the plant with Bordeaux as soon as they begin to vine and follow this at intervals of two or three weeks for six or eight weeks.

Note.—The Station has published bulletins in the past concerning the treatment of fungus diseases and insects on field crops, especially the grains and potatoes. These publications will be mailed to those who wish them, so long as the supply of extra copies last, by addressing the Station for them.

THE RELATION OF WATER SUPPLY TO ANIMAL DISEASES.

A. W. BITTING.

Water is not a food within the strict meaning of the word, but it is necessary to the maintenance of animal life. It forms a part of every bone, muscle, nerve and tissue in the body, and in such large proportions that it aggregates nearly 60 per cent. of the total weight. In young animals the per cent. is somewhat higher, and in old or very fat animals it is somewhat lower. Water is not only necessary because it is such an important component of the tissues, but also as an aid to digestion. Food can only be assimilated when in a soluble state, and hence a large quantity of water is required to carry on this physiological process.

It is not surprising that a relationship may exist between the water supply and disease. This relationship may exist in two ways; first, by not furnishing an adequate supply of water or not being accessible when needed; and second, by the water being the carrier of matter which may cause disease.

The quantity of water required by the different animals has not been determined for all conditions. The horse requires from sixty-four to eighty pounds, or eight to ten gallons per day, a gallon of water weighing eight pounds. During the months of February and March, five horses drank from forty-eight to sixty pounds per head when not at work, and from sixty-two to eighty-four pounds while at work. Forty-four per cent. of the water was drunk in the forenoon and fifty-six per cent. in the afternoon.

Cattle drink more than horses. During the period above referred to, cows not giving milk drank seventy-eight pounds and cows in full flow of milk drank 112 pounds per day. The largest drink was 122 pounds and the greatest amount taken by one animal in one day was 176 pounds.

The Utah Experiment Station found¹ that steers feeding upon dry feed required eighty-three pounds of water per day, while those fed upon green food consumed only thirty-three pounds per day.

Cattle drank seventy-two per cent. of water in the morning and twenty-eight per cent. in the evening.

We have conducted no experiments to determine the quantity of water required during the summer months.

Our experiments to determine the quantity of water consumed by pigs, were also conducted during the month of March. Four lots of pigs were being fed. Lot I received corn; lot II, wheat; lot III, corn and wheat, and lot IV, soaked wheat. Each hog also received three pounds of skim milk per day. Each hog in lot I drank 2.65 pounds of water; in lot II, 5.2 pounds; in lot III, 3.9 pounds; and in lot IV, 5.3 pounds of water per day.

No attempt has been made to determine the quantity of water needed daily for sheep, and I find no satisfactory tests recorded. Owing to the close grazing habits of sheep they drink comparatively little water while upon pasture. They can endure privation as regards water far beyond other domestic animals. This has led to the common belief among farmers that sheep do not need water, and that the dew is sufficient. This is a serious mistake and accounts for the loss of many hundred lambs in this State every year.

The number of times an animal will drink during the day, when allowed full opportunity, is not known, but is indicated in a general way by the stomach.

The stomach of the horse is small, and as might be supposed, does not require much water at a time, but often. The stomach in cattle is very large and rumination (chewing the cud) is performed. This necessitates saturating the food with water before rumination can take place, and probably explains why so much water is drunk in the morning.

The diseases which arise as a result of supplying water in insufficient quantities, or not providing water in accessible places, are sporadic in character; that is, affect only an occasional animal or a few in a herd or flock. Probably the most serious disease having such cause is mad itch in cattle. This occurs especially in the fall of the year, when the cattle are upon dry pasture, or when turned in upon a dry stalk field. It may occur at other times, and also be due to other causes, but without doubt, ninety per cent. of the cases occurring in this State are directly traceable to this cause. Sheep also suffer from impaction and constipation, and large numbers die for want of proper water supply. Hogs, especially young ones, often succumb from like treatment. Horses probably suffer least loss, because they receive the greatest care in this respect, but no doubt many cases of colic, impaction and constipation are traceable to this source.

¹Utah Experiment Station bulletin No. 16, 1892.

It is not the intent to give the symptoms or prescribe treatment for the diseases arising from an insufficient water supply, but to indicate that animals require large quantities of water, and that losses may be expected when not supplied in sufficient quantity or at the proper time. The remedy lies in prevention.

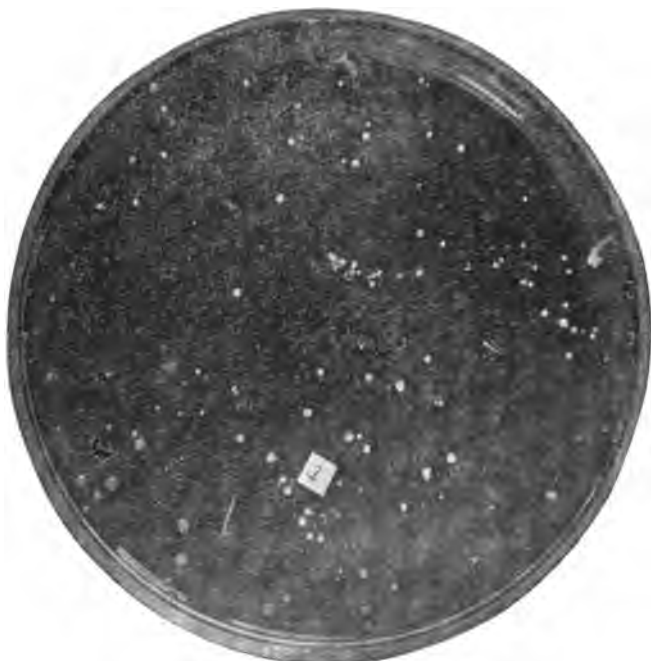


FIG. 14—SHOWING 131 GERMS IN WATER OF TUBULAR WELL 55 FEET DEEP.

The losses that arise from an insufficient water supply are small compared with the losses that arise from supplying water of an improper character. Whether water will act as an agent for the carrying of the germs of disease, the ova, larvae and special stages of parasites, will depend upon the source from which the water is obtained. If it comes from a deep well that is properly protected, these organisms will not be present. (See Fig. 14, showing 131 germs in water from tubular well fifty-five feet deep.) If it is obtained from the surface, as small ponds, ditches and streams, they may be present. Not all surface waters are dangerous, but all are more or less exposed to infection and may become dangerous at any time. The time it becomes dangerous can not be detected by the eye, and may not be detected by laboratory tests.

The earth acts as a filter for all germs that fall upon it, no matter what may be their character. Only a small per cent. will pass through the first inch of soil, and a very small number will pass through the first ten feet. In the first few feet of soil most disease germs are destroyed by the forms that inhabit it, but should they pass further down they are restrained only by the mechanical action of the earth. If, however, a soil becomes saturated with germs, as, for example, in a barn yard, or if the pollution is delivered below the surface, as in a cess-vault, little purification will take place, and the germs may find their way into nearby wells. In order to be certain of the water supply, wells should penetrate an impermeable layer of earth, and the sides be perfectly sealed as with the iron tubular forms, so that no water can gain entrance except from below. A tubular well twenty feet deep is a much deeper well, from a sanitary standpoint, than a dug well of the same depth. It is also true that a shallow well may produce pure water at one time and afterwards become contaminated because of the saturation of the soil with germs, either by the barnyard or vault.

Water from different sources has frequently been tested in the veterinary laboratory, and some conception of the number of germs that are present in water and the filtering property of the soil may be obtained from the following. The quantity in each case is one cubic centimeter, or a half thimble full:

<i>Source.</i>	<i>Number of germs per cubic centimeter.</i>	
Very filthy hog wallow	2,680,000	.....
Ordinary hog wallow.....	730,000	1,420,000
Wabash river above LaFayette.....	12,000	32,000
Wabash river below LaFayette.....	112,000	390,000
Clean looking pond	290,000	.....
Filthy watering trough	248,000	.....
Stock troughs	5,000	21,000
Tile drains	8,000	.....
Six cisterns, without filters.....	5,000	91,000
Four cisterns, with filters	580	3,000
Dug well receiving surface drainage.....	420,000	.....
Dug well 14 feet deep in corner of unprotected barn lot	398,000	.....
Eight tubular wells 60 to 150 feet deep.....	4	16

A test upon the filtering properties of the soil is as follows:

<i>Depth.</i>	<i>Number of germs.</i>	<i>Number of germs after a heavy rain.</i>
Surface	518,400	312,000
1 inch	51,200	.....
2 inch	28,800	.....
3 inch	17,600	.....
4 inch	17,600	.....
5 inch	13,600	.....
6 inch	13,200	47,500
8 inch	8,000	.....
10 inch	12,800	.....
12 inch	5,200	16,000
18 inch	10,400	.....
24 inch	2,000	6,000
30 inch	3,600	.....
36 inch	4,000	4,300
42 inch	3,600	.....
48 inch	3,000	3,100
54 inch	2,800	.....

The bacteria ordinarily found in water are not injurious, but the number present may always be taken as an index of its unwholesomeness. A large number, as shown in Fig. 15, indicates that it is easy for contamination to occur, while a smaller number may be accepted as an evidence of difficulty for extraneous germs to find entrance.

Of the different diseases of live stock in the State, none produce greater loss than hog cholera. For the year ending June 30, 1897, the loss was 899,457 head, valued at \$5,396,742. A careful analysis of the statistics for each township in the State shows that the streams play an important part in its distribution. In 1895, sixty townships bordering upon the Wabash from Cass County to its mouth, show a loss of 15 per cent. of the entire product, and forty-seven townships in the second tier show a loss of 10 per cent. In 1896 the bordering townships show a loss of 29.4 per cent., the second tier 20.5 per cent. and the third tier 16 per cent. In 1895, forty-four townships bordering upon the north fork of the White River, lost 13.8 per cent., and forty-two townships in the second tier, 6.5 per cent. In 1896 the loss in the first tier of townships was 23.1 per cent., in the second tier 15.6 per cent., and in the third tier 7.5 per cent. In 1896, forty-four townships bordering upon the south fork of the White River lost 20 per cent. of the hogs; fifty-eight townships in the second tier lost 15 per cent., and forty-two townships in the third tier lost 10.9 per cent. In 1897, the first tier of townships lost 32.1 per cent., the second tier 18.2 per cent., and the third tier 14.5 per cent. In other words the losses in the bordering tier of townships is from 33 per cent. to 112 per cent. greater than in the second tier, and from 83 per cent. to 208 per cent. greater than in the third tier. In each case the differences in the per cent. of loss in the

different tiers is much less in the third year, as in that time the disease had become generally distributed. The statistics from 1882 to 1897 show the annual loss to be greatest along the rivers. These statistics have been presented because the number of townships involved is so large in each case that no local influences could have produced the result. The territory involved makes three long narrow strips in the State at distances sufficiently removed from each other, so that only a positive factor could show the marked differences that exist. The criticism is sometimes made that more corn is grown along the river and more hogs are fed, which might account for the difference observed. This point has been carefully worked

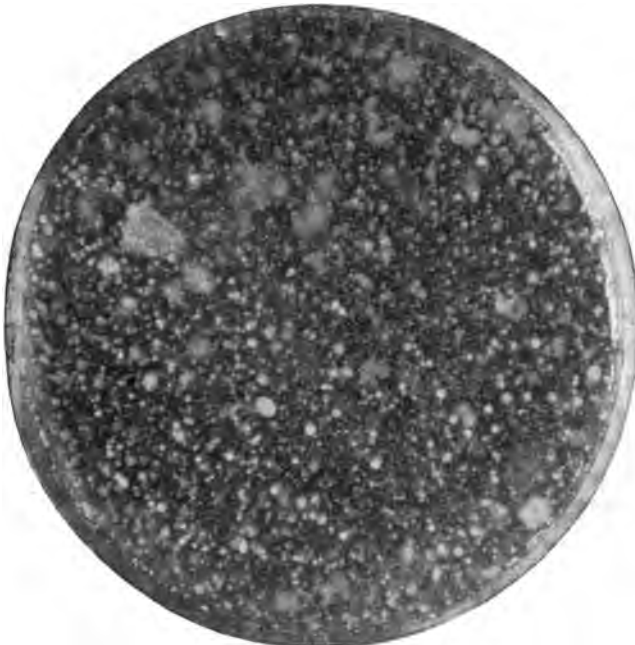


FIG. 15—SHOWING ABOUT 518,400 GERMS IN SURFACE WATER.

over, and no relationship is traceable to the number of hogs per square mile and the per cent. of loss per square mile. An investigation made in 1895 and 1896 showed that the breeders of pure bred swine, who escaped hog cholera, nearly all used well water. Drs. Salmon and Smith came to this conclusion in their investigation of hog cholera.* "Perhaps the most potent agents in the distribution of hog cholera, are streams. They may become infected with the specific germ when sick animals are permitted to go into them, or when dead animals or any part of them are thrown into the water. They may even multiply when the water is contaminated

*Report upon Hog Cholera, Bureau of Animal Industry, 1899, p. 124.

with fecal discharges or other organic matter. Experiments in the laboratory have demonstrated that hog cholera bacilli may remain alive in water for four months. Making all due allowance for external influences and competition with the bacteria in natural water, we are forced to assume that they may live at least a month in streams. This would be time enough to infect every herd along its course."

If the larger streams have such a marked influence upon the percentage of loss along their courses, it is only reasonable to suppose that the smaller streams and ponds have a like effect. It is common practice to dig out a pond to receive the surface water from buildings and yards, to dam ravines and creeks, to catch the water from the tile drains and



FIG. 16—DRINKING WATER SOURCE IN ORDINARY PIG LOT.

springs for water for hogs as is illustrated in Fig. 16. In such cases it follows that they receive only surface water. It is apparent then, that the first step to be taken in the prevention of hog cholera, is the securing of a wholesome water supply.

All animals are more or less subject to parasitic diseases, and the intestinal tract, owing to its relation to the food and water consumed, becomes the favorite seat of attack. Countless numbers of germs, eggs, larvae, etc., enter with the food, but only a small part are in a proper state of development when they enter or they do not find suitable conditions for continuing life, and therefore perish. Water plays a more important part as a carrier of parasites than does the food.

The life cycle of the parasites that affect animals, nearly always includes a stage of development outside of the body. Some parasites are

passed out of the body as eggs. These hatch and after undergoing greater or less change, they may be prepared to again inhabit another animal. Some pass out, as larvae, and after a certain time may infect an animal if taken in the stomach. A few require an intermediate host, as the liver-fluke, which infects the snail, and most tape worms must usually pass one period of their existence in a different species of animal before they can again cause disease in another animal. Altogether the number of parasites which again find their way into another host, represent a very small per cent. of the eggs produced. The eggs and larvae of all these parasites contain a great deal of water and are easily killed by drying. Moisture is a necessary factor in their existence outside of the body, and hence it is that they are found in large numbers in surface water and are ingested (taken up) with it. Bacteria can stand drying better than parasites, but must have water in which to multiply. It follows then, that fewer parasitic diseases of stock will occur upon high pasture land when well water is furnished, than upon bottom land where they must depend upon a natural supply.

Among the most destructive parasitic diseases with which we have to contend, is the twisted stomach worm of sheep (*Strongylus contortus*). It is found especially on low lands along creek bottoms and around ponds. It affects sheep of all ages but is particularly fatal to lambs. In 1896 it caused a loss of 50,000 lambs and sheep in this State. In seasons of excessive rainfall it may occur upon any pasture, but in ordinary seasons it causes little damage except upon the low pastures. The eggs and embryos are passed from the sheep and fall with the droppings upon the pasture, and may be washed into the streams or ponds from which the sheep drink. Moisture is necessary for their existence outside of the body, and the dryer the pasture, the less the opportunity for conveying the parasite from one sheep to another. In seasons of heavy rainfall, when the grass is kept constantly wet, the danger may be mitigated to a certain extent by changing the sheep from one pasture to another every other day. This spring has been very favorable for the transmission of worms, and as the disease does not manifest itself for some time after infection, it will not be a surprise to learn of the loss of many lambs this summer.

Another disease of sheep that is conveyed in the same way, is the nodular disease. It is due to a small worm, and while it does not manifest itself until winter, the time the infection is spread from one sheep to another is during the summer months.

Such parasitic diseases as paper-skin, liver-fluke and lung worm of sheep, and the worms in hogs, horses and cattle, are all conveyed in much the same way and are largely due to surface water. Pure water from deep wells is the prevention.

CORN MEAL AND SHORTS AS FOOD FOR PIGS.

C. S. PLUMB AND W. B. ANDERSON.

Many feeding experiments have been conducted upon swine, both in the United States and Europe, some few of which have been in the same field as the one herewith reported on. This is a comparison of results secured from feeding a mixture of corn meal and wheat shorts to one lot of pigs and pure corn meal to another lot.

The pigs used were six sows, five and one-half months old, at the beginning of the experiment. They were divided as evenly as possible into two lots of three each. The pigs were high grade Chester Whites, and were bred on the Station farm. The pigs in lot I, the shorts-corn meal ones, were Nos. 138, 142 and 143, while those of lot II, the corn meal ones, were 139, 166 and 168.

The pigs were weighed every Saturday in the afternoon, and for four days preceding the experiment they were weighed daily, and the average of these four days' weights is taken for the average weight of each pig at the beginning of the experiment, which extended from December 25, 1897, to March 5, 1898, or seventy days.

The pens in which the pigs were kept are of much the same size, being about 30x15 feet, with a comfortable small shelter house in each lot. While the weather was such as to cause the pens to be muddy more or less, they were kept in good sanitary condition by frequent cleaning and bedding.

In this experiment seven days or a week is termed a period.

The following table (I) gives the weights of the pigs from the beginning to the end of the experiment, the total gain in weight for each pig and for the three of each lot, the average daily gain for each animal and for each lot, and the average daily gain per head per lot.

An examination of this table shows that those fed the mixture of shorts and corn meal gained a total of 353½ pounds, while the corn meal lot gained but 326¾ pounds. It will be also noticed that the three pigs of lot I made a combined daily growth of 5.05 pounds, or an average of 1.68 pounds per pig, as compared with 4.66 pounds for lot II, or an average of 1.55 pounds per pig.

TABLE I. WEIGHTS OF PIGS.

DATE.	Lot I. Shorts-corn meal.				Lot II. Corn meal.			
1897-1898	No.138	No.142	No.143	Total.	No.139	No.166	No.168	Total.
December 25	139.25	115	133.25	387.5	117.25	145.25	123.25	385.75
January 1	152	127.5	149.5	429	126	163	134	423
January 8	167.5	136.5	164.5	468.5	136.5	179	149.5	465
January 15	178	150	180	508	150	190	158.5	498.5
January 22	191	160	198	549	151.5	200.5	166	518
January 29	201	164	201.5	566.5	157.5	209	177	543.5
February 5	209	180	216.5	605.5	166	221	185.5	572.5
February 12	223	192	227	642	177.5	240	193	615.5
February 19	233	200	237	670	188.5	251	207.5	647
February 26	241.5	213.5	249	704	195	260.5	216.5	672
March 5	253	223.5	264.5	741	208.5	279	230	717.5
Total gain in weight . . .	113.75	108.5	131.25	353.5	85.25	133.75	106.75	325.75
Average daily gain	1.62	1.55	1.87	5.05	1.21	1.91	1.52	4.66
Average daily gain per head per lot	1.68				1.56			

Attention is here called to the fact, however, that the heaviest and lightest pigs were in lot II, from first to last, and while none of the animals in either lot were sick during the experiment, unless in a very incidental way, pig 139 did not prove as good a grower as the rest of the pigs. But even had she laid on twenty-five pounds more flesh, lot II would still have fallen slightly below lot I in total weight.

From the practical feeders' standpoint these pigs made uncommonly good gains. Where five of six animals of this class average in daily gain for seventy days from one and one-half to nearly two pounds each, it may be considered a very satisfactory showing.

The foods used were a mixture of equal parts by weight of wheat shorts and corn meal fed lot I, while lot II was fed corn meal only. The grain was weighed out and mixed with warm but not hot water. Besides this, drinking water, salt and ashes were supplied freely to each pen.

The pigs were fed about seven in the morning and five in the afternoon, and once or twice in severely cold weather at noon.

The following table (II) shows the amount of food eaten during each period by each lot, the total amount by each lot, and the average amount per day per lot and pig. The food was weighed out for the three pigs in each lot, which ate together from one trough. The figures of the average amount eaten per day per pig are on the assumption that each pig ate

one-third of that placed in the trough. This is in fact not so, but in no other way can we secure an estimate of the amount eaten daily by each pig, unless the animal is kept by itself and the food weighed separate.

The table shows that lot I was fed 718 pounds of shorts and the same amount of corn meal, making a total of 1436 pounds of the mixture, while lot II was fed 1413 pounds of corn meal.

The pigs of lot II did not at all times eat with as good an appetite as did those of lot I, and especially so on two different occasions.

TABLE II. TOTAL POUNDS FOOD EATEN BY PIGS. IN PERIODS.

1897 1898	LOT I. Shorts-Corn meal.			LOT II. Corn meal.
	Period.	Shorts.	Corn meal.	Total Grain.
	I December 25-January 1	62	62	124
	II January 1-8	68.5	68.5	137
	III January 8-15	73.5	73.5	147
	IV January 15-22	73.5	73.5	147
	V January 22-29	71.5	71.5	143
	VI January 29-February 5	71.5	71.5	143
	VII February 5-12	73.5	73.5	147
	VIII February 12-19	73.5	73.5	147
	IX February 19-26	73.5	73.5	147
	X February 26-March 5	77	77	154
	Total	718	718	1436
	Average amount eaten per day per lot	10.25	10.25	20.51
	Average amount eaten per day per pig	3.41	3.41	6.82

COST OF PRODUCTION.

The cost of production is the feature of the experiment of most interest in the practical farmer.

A consideration of the figures given shows that the value of the food consumed, as based on Lafayette market quotations and what we paid for the shorts, is as follows:

LOT I.

Was fed 718 pounds shorts at 70 cents 100 pounds.....	\$5 03
Was fed 718 pounds corn meal at 65 cents 100 pounds.....	4 67
	<hr/>
Total value food eaten by lot I.....	\$9 70

LOT II.

Was fed 1413 pounds corn meal at 65 cents 100 pounds.....	\$9 18
This shows a slightly greater value for the food fed lot I over lot II.	
The cost of the food for each pound of gain was as follows:	

LOT I.

Cost of food, \$9.70.
Pounds of gain made, 353.5.
Cost of food for each pound of gain, .0274 cents.
Cost of each 100 pounds gain in weight, \$2.74.

LOT II.

Cost of food, \$9.18.
Pounds of gain made, 326.75.
Cost of food for each pound of gain, .028.
Cost of each 100 pounds gain in weight, \$2.80.
A further study of the work shows that in—
Lot I 4.06 pounds shorts and corn meal produced one pound gain, or 100 pounds of this mixture gave a gain of 24.6 pounds.
In lot II 4.32 pounds corn meal produced one pound of gain or 100 pounds of this food gave a gain of 23.1 pounds.

RELATION OF PERIODS OF HEAT OR OESTRUM TO GAINS IN WEIGHT.

In this experiment, sows only were used, and as they were neither pregnant or suckling young, they came in heat at intervals during the feeding. During one or two of the periods, it was thought that owing to this condition, several of the sows did not gain in weight as they would have otherwise, and especially 139 and 168, a boar being placed near their pen for a few weeks. A comparison, however, of the periods of heat, with gains in weight, gives no conclusive evidence that this influence retards growth, though one might ordinarily suppose it would. For illustration, during the period ending February 12, No. 139 was in heat from Monday till Thursday, yet she showed a gain during that week of 11½ pounds.

Sow 168 was in heat from Tuesday till Friday, yet she showed a gain of $12\frac{1}{4}$ pounds for the period. During the week ending January 29, sows Nos. 142 and 143, in a pen away from the boar, were also in heat, and they made but small gains, one making 4 and the other $3\frac{1}{2}$ pounds for the week, yet we have no special evidence to show that being in heat was the cause of the light gains. In fact there were other weeks, when the sows were not in heat, when they made but slightly larger gains over some of those when in heat, or even smaller.

A consideration of the weather conditions shows these weeks to have been at least average ones for animal comfort.

The observations made, therefore, with these sows, give no substantial evidence that the periods of heat or oestrus materially affect the gain in weight.

SKIM MILK AS FOOD FOR YOUNG, GROWING CHICKENS

W. B. ANDERSON.

The fowls used in this experiment were twenty young chickens, ten Plymouth Rocks and ten Houdans. They had, previous to the beginning of the experiment, been allowed to run at large together, getting the same feed, treatment and care. The chickens selected were not uniform in size, but large and small were equally divided between the two lots. They were taken from two sittings, one brood about two and the other one and one-half months old at the beginning of the experiment. The chickens were separated into two groups, known as Lots I and II, with five of each breed in a lot.

The food, care and treatment of the two lots were identical, except that the fowls in Lot II received, in addition to the food given Lot I, all the skim milk they would drink. Both lots were given all they would eat of a mixed food consisting of two parts crushed corn, one part bran and one part ground oats. They were fed three times a day, except on Sundays, when an increased amount of food was given at the morning and evening meal.

Weights were taken of the amounts of food given each lot, and of the refuse left from day to day. Both lots were given all they would consume of cracked bone, cabbage, lettuce and water, of which no record was kept. The weights of all foods and of the fowls were recorded in ounces.

The following table shows the weight of each chicken and the total weight of both lots, taken July 11, 1896, at the beginning of the experiment:

TABLE III. WEIGHTS, IN OUNCES. JULY 11.

LOT II. WITHOUT MILK.		LOT II. WITH MILK.	
No. of Chicken.	Weight.	No. of Chicken.	Weight.
1	19	5	16
2	16.5	6	13
3	10	7	11
4	16.5	9	12
8	9.5	10	14.5
12	10	11	19
14	9	13	9
15	14.5	17	12
16	8	18	7
20	9	19	7
Total	121	Total	120.5

The above table shows a difference of one-half an ounce in favor of Lot I at the beginning of the experiment.

Table IV shows the total food consumed for each week and the weekly weights of fowls during the entire experiment of eight weeks.

TABLE IV.

DATE.	OUNCES OF FOOD CONSUMED.			WEIGHT OF FOWLS.	
	Lot I.	Lot II.		Lot I.	Lot II.
	Mixed Feed.	Mixed Feed.	Milk.	Weight-oz.	Weight-oz.
July 18	182.5	285.5	39	131.5	152
July 25	273	301.5	85.5	156	178
August 1	344.5	317.5	182.5	180.5	213
August 8	474.5	498.5	278.5	220	277
August 15	412	449.5	233.5	216.5	319
August 22	384	514.5	299.5	250	391.5
August 29	408	556.5	216.25	270	437
September 5	398.5	553	131.5	297.5	476.5
Total food consumed . .	179.8 lb.	217.3 lb.	90.4 lb.		

† Combined weight of nine chickens.

No. 2 from Lot I died August 18, leaving only nine in the lot.

From the above table it is shown that Lot II consumed 37.5 pounds of mixed feed more than Lot I, and 90.7 pounds of milk besides.

In Table V is given the weekly gain for each lot and for each chicken during the experiment.

TABLE V. WEEKLY GAIN PER LOT AND PER CHICKEN.

DATE.	LOT I. WITHOUT MILK.		LOT II. WITH MILK.	
	Total Gain.	Average Gain per Chicken.	Total Gain.	Average Gain per Chicken.
July 18	10.5 oz.	1.05 oz.	31.5 oz.	3.15 oz.
July 25	24.5 "	2.45 "	26 "	2.6 "
August 1	21.5 "	2.15 "	35 "	3.5 "
August 8	39.5 "	3.95 "	64 "	6.4 "
August 15	24.5 "	2.73 "	42 "	4.2 "
August 22	33.5 "	3.35 "	75.5 "	7.55 "
August 29	20 "	2.22 "	43.5 "	4.35 "
September 5	27.5 "	2.75 "	39.5 "	3.95 "
Average gain per week		2.62 oz.		4.46 oz.

† Combined weight of nine fowls.

From the table it will be seen that both lots made the greatest gains during the same weeks, viz.: August 1 to 8 and 15 to 22, indicating that both lots were alike susceptible to favorable external conditions.

In Lot I there was slow increase in average gain, and it was very irregular throughout the experiment.

In Lot II the increase in average gain was much more rapid and continued for a longer period.

The mixed food consumed by the two lots during these periods, August 1 to 8 and 15 to 22, was greater in amount than during some of the other periods, while the amount of milk consumed was greatest during these weeks. From this it appears that the great increase of average gain of Lot II over Lot I during these periods was largely due to the increased consumption of milk of that time.

From Tables IV and III it is also shown that during any period when there is an increased consumption of milk in Lot II there is a corresponding increase in the average gain during those periods and vice versa.

Table VI shows the weights of each chicken in Lots I and II at the beginning of the experiment (July 11) and at its close (Sept. 5).

TABLE VI.

LOT I. WITHOUT MILK.			LOT II. WITH MILK.		
No. Chicken.	Weights.		No. Chicken.	Weights.	
	July 11.	September 5.		July 11.	September 5.
1	19 oz.	43 oz.	5	16 oz.	53.5 oz.
2	16.5 "	41 "	6	13 "	52 "
3	10 "	36.5 "	7	11 "	46 "
4	15.5 "	39 "	9	12 "	44 "
8	9.5 "	26 "	10	14.5 "	50 "
12	10 "	29.5 "	11	19 "	68 "
14	9 "	27.5 "	13	9 "	38 "
15	14.5 "	38.5 "	17	12 "	47 "
16	8 "	24 "	18	7 "	37.5 "
20	9 "	33 "	19	7 "	40 "

*Died August 18.

SUMMARY.

1. If skim milk be added to the ration fed to young chickens it will increase the consumption of the other foods given.
2. The great increase in average gain was coincident with the periods when the greatest amount of skim milk was consumed.
3. Skim milk is especially valuable as a food for young chickens during the hot, dry weather and becomes of less importance as the chicken grows older and the weather becomes cooler.

Errata for Bulletin No. 67:

Page 67. The cost per pound gain per lot in cents, \$4.57, should be \$4.80. This correction should be made in the third line from bottom of same page. On the fourth line from top of page 70 the same error should be corrected.

Page 66. The total gain of Lot IV should be 443 $\frac{1}{4}$ instead of 442 $\frac{1}{4}$ pounds. The same correction should be made on page 67 in Lot IV, showing pounds of gain made per lot.

FIELD EXPERIMENTS WITH WHEAT.

W. C. LATTA AND W. B. ANDERSON.

(For Summary of these Experiments, see page 560.)

In the following pages are given the results of the trials of varieties of wheat in 1897 and 1898, and a resume of field experiments with fertilizer and manure on the wheat crop.

The year 1896-97 was characterized by a favorable fall, severe winter and very favorable spring and summer. The year 1897-98 was marked by an unfavorable fall and severe winter. The spring of 1898 was favorable to wheat, but the humid air of June encouraged the development of fungous diseases which prey on the wheat crop. This was especially true of wheat scab, which was very prevalent in this locality on certain varieties of wheat.

COMPARISON OF VARIETIES.

The two chief purposes of this experiment are (1) to test the merits of the newer varieties of wheat, and (2) to ascertain how long certain standard wheats can be grown on the Station farm without deterioration. The more important results of the experiment are given in the following table:

Of the newer varieties Nos. 15, 16, 18 and 23 seem worthy of trial. These all produced a straw of good strength. Nos. 1, 7, 16, 18 and 23 were practically free from scab. The other new varieties can hardly be recommended. No. 16 appears to be the same as No. 7. No. 14 is the same as No. 11. Nos. 17 and 21 are very much alike, although the grain of the latter is a little lighter in color. No. 18 is nearly if not quite the same as the Poole wheat.

Nos. 1 and 7 have been grown on the Station farm fifteen years in succession. The average yield of the former is 29.08 bushels to the acre and of the latter 28.94 bushels. So far as can be observed these two wheats

YIELDS PER ACRE OF VARIETIES OF WHEAT.

Number.	NAME.	B. Bearded. S, Smooth.	No. of Years Grown.	Bushels, 1897.	Bushels, 1898.	Lbs. per Measured Bushel.
1	Velvet chaff	B	15	*29.95	*22.72	62.2
2	American bronze	B	3	16.50		55.6
3	Bearded life	B	2	24.75		57.3
4	No. 102	B	2	9.63		56.0
5	Willits	B	6	23.83		58.0
6	Early Arcadian	S	2	8.71		55.0
7	Michigan amber	S	15	30.25	24.67	62.0
8	Dawson's golden chaff	S	1	14.67		56.0
9	Russian	B	2	31.85	17.83	61.0
10	White Clawson	B	1	24.06		57.5
11	Rudy	B	6	17.65	24.33	62.0
12	Valley	B	8	10.66		57.5
13	Buda Pesth	B	1		20.00	62.0
14	Egyptian or Sterling	B	1		25.33	62.0
15	New Columbia	S	1		24.67	61.5
16	Early ripe	B	1		*23.92	61.5
17	White golden cross	S	2		19.83	60.0
18	Hybrid prolific	B	1		22.50	62.0
19	Diamond grit	B	1		21.33	61.8
20	Gold coin	B	1		22.33	61.0
21	Pedigree giant	B	1		20.00	59.8
22	Jones' longberry No. 1	B	1		19.00	60.5
23	Harvest king	S	1		26.17	62.0
24	Improved fultz	S	1		22.17	61.0
25	Long amber	S	1		19.17	59.0
26	Oakta chief	S	1		16.00	57.0
27	Jones' winter life	S	6		24.33	61.0

* Average of three plats.

show no signs of "running out," and the high average yields which they have maintained certainly do not support the theory that seed wheat must be changed every few years.

GROWING WHEAT WITH AND WITHOUT FERTILIZERS
AND MANURE.

In 1889 a series of experiments was inaugurated to ascertain the effect of various methods of cropping and fertilization on the quality and yield of crops. For this purpose plats containing one-tenth acre each were staked off in groups of seven to each series. The several plats of each series were separated from each other by spaces just half as large as the plats.

The accompanying diagram shows the arrangement of plats and intervening spaces in each series, the surrounding border and the plan of fertilization.

Plats 1, 4 and 7 in each series receive no manure or fertilizer. The entire area of each series, including borders, plats and spaces between plats, is kept under crop, and the crop is the same for all the plats of a series. That is, one year all the plats, spaces and borders are in corn.

The next year the entire series is devoted to some other crop, and so on. This plan secures uniform conditions, which are essential to accurate work.

DIAGRAM OF PLATS.

No. 1.
No. 2. Heavy fertilization.
No. 3. Medium fertilization.
No. 4.
No. 5. Heavy manuring.
No. 6. Medium manuring.
No. 7.

PLAN OF CROPPING.

The systems of cropping on the several series are as follows:

Series I.—Corn and wheat are grown in alternate years. Clover is sown as an intercrop with the wheat and plowed under the following spring as a green manuring for corn.

Series II.—Corn, oats, wheat. In this three year rotation are two intercrops, (1) rye, sown in the corn, to be turned under the following spring for oats, and (2) clover, sown in the wheat, to be plowed under the succeeding spring for corn.

Series III.—Wheat every year. Clover is sown as an intercrop each spring and turned under in the succeeding fall for the next wheat crop.

Series V.—Corn, oats, wheat, clover, one year each. Rye is sown as an intercrop in the corn, as in Series II.

Series VI.—Corn, beets, oats, wheat, grass, grass. The "grass" in this six year rotation is a mixture of timothy and clover. Rye is sown as an intercrop in the corn.

The grain and root crops of the several series are fertilized and manured as per diagram. The clover and grass crops receive no fertilization. The following table embodies the results of the experiments so far as they relate to the wheat crop.

The table gives the average amount of fertilizer and manure used, the average yield and average increase per acre, and the average cost of the fertilizer or manure for each bushel of increase produced. In calculating the cost of the fertilizer the freight is added to the manufacturer's cash price in "ton lots." No allowance is made for hauling and applying, as this does not usually involve any cash outlay to the farmer. The manure is reckoned at \$1.00 per ton. It was obtained free of charge in the city of Lafayette, and the actual cost of hauling and applying is less than \$1.00 per ton. The increased yield of straw from fertilization is reckoned at \$3.00 per ton. This is approximately the commercial value of the fertilizing ingredients which it has drawn from the soil. The value of the increased yield of straw is deducted from the cost of the fertilizer or manure in each case. The remainder, which is the net cost of the increased yield of grain, is divided by the number of bushels of increase, which gives the cost of the fertilizer or manure for each bushel of increase.

The "mixed fertilizer" of the table is composed of high-grade goods, so mixed as to furnish approximately two parts of phosphoric acid to four and five-tenths parts of nitrogen and three of potash.

TABLE GIVING RESULTS OF EXPERIMENTS IN FERTILIZING WHEAT.

SERIES I. AVERAGE OF FIVE WHEAT CROPS.

No. of Plat.	FERTILIZATION.	Pounds Fertilizer or Manure.	Average Yield Bushels.	Average Increase, Bushels.	Av. Weight per Struck Bushel	Average Cost of Fertilizer per Bushel.
1	Nothing		16.01		*57.06	
2	Mixed fertilizer	430.8	33.69	19.51	58.31	\$0 31
3	Mixed fertilizer	298.6	30.42	15.07	69.00	28
4	Nothing		15.39		55.88	
5	Horse manure	9600 0	26.98	11.46	69.56	
6	Horse manure	8002 0	24.84	9.39	58.75	24
7	Nothing		15.65		55.31	25

EXPERIMENTS IN FERTILIZING WHEAT—Continued.

SERIES II. AVERAGE OF THREE WHEAT CROPS.

No. of Plat.	FERTILIZATION.	Pounds Fertilizer or Manure.	Average Yield Bushels.	Average Increase Bushels.	Av. Weight per Struck Bushel.	Average Cost of Fertilizer per Bushel.
1	Nothing		24.22		59.08	
2	Mixed fertilizer	439.7	29.54	7.54	59.42	\$0 98
3	Mixed fertilizer	199.3	30.69	7.75	59.58	31
4	Nothing		21.67		58.47	
5	Horse manure	8833.3	31.04	8.41	60.69	33
6	Horse manure	5890.0	29.86	7.77	60.19	18
7	Nothing		24.44		58.08	

SERIES III. AVERAGE OF NINE WHEAT CROPS.

1	Nothing		16.82		*57.90	
2	Mixed fertilizer	322.1	21.27	4.98	57.86	\$1 20
3	Mixed fertilizer	183.5	20.75	4.45	58.57	75
4	Nothing		15.77		57.49	
5	Horse manure	8277.8	21.32	5.05	58.82	58
6	Horse manure	5988.9	20.65	4.38	58.39	64
7	Nothing		16.78		57.80	

SERIES V. AVERAGE OF TWO WHEAT CROPS.

1	Nothing		21.08		†62.50	
2	Mixed fertilizer	358.0	26.21	5.94	63.25	\$1 12
3	Mixed fertilizer	232.5	27.08	6.21	63.92	69
4	Nothing		20.67		†64.17	
5	Horse manure	8500.0	26.96	7.64	64.08	46
6	Horse manure	5835.0	25.21	5.14	64.00	51
7	Nothing		19.48		62.08	

SERIES VI. AVERAGE OF TWO WHEAT CROPS.

1	Nothing		23.46		59.25	
2	Mixed fertilizer	486.3	31.13	9.17	60.50	\$0 88
3	Mixed fertilizer	192.5	26.67	8.28	60.50	80
4	Nothing		23.68		†61.00	
5	Horse manure	8500.0	27.89	3.41	60.38	70
6	Horse manure	5500.0	27.59	3.02	60.25	53
7	Nothing		25.46		60.00	

* Average of four crops. † Data for one year only. ‡ Doubtless an error in weighing.

In calculating the increased yields from fertilization, the manure and fertilizer have been credited in every case with the average increase on the flanking spaces, as compared with the plats not fertilized. Sometimes the increase on the flanking spaces is considerable. It is due to diffusion of fertilizer or manure beyond the limits of the fertilized plats, and it is only fair to credit this to the fertilization.

The points of special interest in the foregoing table are:

1. Effect of system of cropping on yield of unfertilized plats.
2. Relative increase in yield from fertilization in the different series.
3. Relative economy of heavier and lighter applications of fertilizer.
4. Relative economy of heavier and lighter applications of manure.
5. Relative economy of commercial fertilizer and manure in growing wheat.

The above points are all clearly brought out in the following group averages:

1. The average yield of the three unfertilized plats in each of the series is as follows:

<i>Series and System of cropping.</i>	<i>Bushels per acre.</i>
I. Corn and wheat in alternate years.....	15.68
II. Three course: Corn, oats, wheat.....	23.44
III. Wheat grown continuously.....	16.45
VI. Four course: Corn, oats, wheat, clover.....	20.41
VI. Corn, beets, oats, wheat, grass, grass.....	24.20

The above results indicate the advantage of a good rotation of crops as a means of securing fair yields, without fertilization in soils of medium fertility. The variation in seasons doubtless has something to do with the differences in yield noted above. It will take several years longer to eliminate the effect of season and bring out clearly the influence of the system of cropping.

2. The following table gives yield and increase per acre from fertilization (average of the four fertilized and manured plats) in each series:

<i>Series and System of cropping.</i>	<i>Yield bushels.</i>	<i>Increase bushels.</i>
I. Corn and wheat.....	28.95	13.86
II. Corn, oats, wheat	30.28	7.87
III. Wheat every year.....	21.00	4.72
V. Corn, oats, wheat, clover.....	26.37	6.23
VI. Corn, beets, oats, wheat, grass, grass.....	28.32	4.72

Series I, which is devoted to the most exhaustive system of cropping, shows the largest increase, as might be expected.

Series II shows a low increase, although the average yield of the four fertilized plats is greater than that of Series I. The smaller increase in this series is due to the high average yield (over 23 bushels) of the plats not fertilized.

Series III shows both a low yield and a low increase from fertilization. It is probable that wheat, when grown year after year in the same ground, can not utilize available plant food as fully as if grown in a rotation with other crops. It is doubtless also true that the considerable intervals between successive wheat crops permit some of the added fertility to leach away or become converted into inert forms of plant food.

The low increase in Series V is doubtless due to the fact that the two years in which wheat was grown on this series (1890-91 and 1894-95) were less favorable than other years to the action of the fertilizer and manure.

Series VI, although showing a good yield from fertilization, produces a low increase because of the very good average yield (over 24 bushels) of the plats not fertilized.

3. The lighter applications of fertilizer have proved more economical than the heavier doses, as will appear from the following figures, which give the average amount of fertilizer used to the acre, and the average cost per bushel of increase:

	<i>Pounds fertilizer.</i>	<i>Cost of fertilizer per bushel.</i>
Lighter application, average of five plats.....	221	\$0 57
Heavier application, average of five plats.....	406	90

A small profit has been obtained from the lighter applications while the larger quantities have generally been used at a financial loss.

4. The lighter applications of manure have proved only slightly more profitable than the heavier doses. The average amount of manure to the acre and the average cost of the manure per bushel of increase are as follows:

	<i>Pounds manure.</i>	<i>Cost of manure per bushel.</i>
Lighter applications, average of five plats....	6,243	\$0 42
Heavier applications, average of five plats..	8,742	46

5. The relative economy of the commercial fertilizer and manure is clearly shown in the figures which follow:

	<i>Pounds fertilizer or manure per acre.</i>	<i>Cost of fertilization per bushel.</i>
Average of ten fertilized plats.....	314	\$0 73
Average of ten manured plats.....	7,493	44

We see from the figures just given that the horse manure has returned a handsome profit. At the prices of wheat which have ruled for the past decade the fertilizer has returned little or no profit, if we take into account the average of all the fertilized plats. We should not forget, however, that the lighter applications of fertilizer returned a fair profit as a rule.

A further credit is due to the fertilizer and manure used in Series VI, on account of the yields of hay on the fertilized plats, produced without any additional fertilizer or manure. There would have been a like credit for Series V but for the failure of the clover in both years that it was

sown. Allowing \$5.00 per ton for the increased yield of hay on the fertilized and manured plats of Series VI and crediting the fertilization accordingly, we find the net cost per bushel of increase on the several plats of this series to be as follows:

	<i>Pounds fertilizer.</i>	<i>Pounds manure.</i>	<i>Cost of fertilization per bushel.</i>
Plat 2, fertilized.....	486	.....	\$0 493+
Plat 3, fertilized.....	192	.....	040+
Plat 5, manured .....	...	8,500	086+
Plat 6, manured .....	...	5,500	041+

The above table makes a very favorable showing for both fertilizer and manure. With wheat at its present price, even the heavier application of fertilizer on Series VI returns a profit. In the case of the lighter applications of fertilizer and of both heavy and light application of manure, the cost of the increased yield of wheat is merely nominal.

The results given in the foregoing pages must be considered as a report of progress. Settled conclusions have not been reached. The following explanations seem necessary to an intelligent understanding of the results thus far attained:

1. The experiments were originally undertaken to ascertain how far yields might be increased by heavy fertilization. Although the first plan has been modified, the amounts of nitrogen applied are still larger than is customary with farmers who regularly use commercial fertilizers. Other experiments are in progress to ascertain the relative importance of nitrogen, phosphoric acid and potash in producing crops on the soil of the Station farm, and from time to time the fertilizer experiments will be modified as results may warrant.
2. The soil of the Station farm is yet much more productive than most of the lands in the State on which fertilizers are now being extensively used. A soil that will yield, under a judicious rotation of crops, 20 to 25 bushels of wheat to the acre without fertilization can not be expected to make large returns from the addition of fertilizer or manure.
3. The results above given do not make a complete showing for the manure. Other experiments here have proved that a heavy application of horse manure has not been exhausted in fifteen years.

SUMMARY.

1. Standard varieties of wheat have maintained their yield and quality for fifteen years in the same soil.
2. There is a very wide range in the ability of different varieties of wheat to resist fungous diseases, and in their adaptation to local soil and climatic conditions.
3. Most of the new varieties of wheat have failed, as a rule, to do as well as standard varieties, which have long been grown here.

4. Applications of about 200 pounds of high-grade fertilizer to the acre have been found fairly profitable in growing wheat.

5. Applications of three to five tons of fresh horse manure to the acre have generally been found profitable upon the wheat crop.

6. Heavy applications of manure and commercial fertilizer to the wheat crop have proved profitable in proportion to the exhaustiveness of the system of cropping followed.

7. Light fertilization, only, has proved profitable in connection with a judicious rotation of crops.

8. Continuous wheat growing in the same soil, both with and without fertilization, has proved unprofitable.

TESTS OF STRAWBERRIES, RASPBERRIES, BLACK- BERRIES AND GRAPES.

JAMES TROOP.

Since the last bulletin on small fruits was issued from the Experiment Station, over 100 varieties of strawberries and a large number of varieties of other small fruits have been tested, including many that have been sent to us for trial by the originators or introducers, and while most of them seem to possess some good qualities, many have done only moderately well, and others have been discarded. The list of strawberries now grown is so large it is not best to spend time on a new variety unless it shows at once that it possesses some extra good qualities which other older varieties do not. Out of the 86 varieties fruited the past season, 15 could be selected that would contain about all the good qualities found in the whole list. To be sure, some of those varieties rejected from our list might give better results under different conditions and on different soil, but it has been our experience during the past ten years that varieties which do the best for us during a series of years prove to be the varieties which become the most generally cultivated. Our records show that Bubach, Warfield, Haveland, Enhance, Gandy, etc., have been reported on favorably every year since their introduction, and these are now practically standard varieties. On the other hand, most of the varieties that we reported on adversely ten years ago have dropped out of the catalogues and are not heard of at the present time. This change of varieties, however, is constantly going on, and will continue to go on so long as men continue seeking for something better. This fact makes it necessary for us to continue the varietal tests from year to year. It is a fact worthy of note that of the entire list of strawberries grown at the Experiment Station in 1885 only five are now seen mentioned in the catalogues, and these are grown only in certain widely separated localities. The Old Wilson's Albany, for

example, is still the favorite of a few growers. The same may be said of raspberries. Brandywine, Turner, Shaffer, Gregg, Ohio and Souhegan are about all that are left of the older varieties, while many new varieties have come to take the places of those which have been discarded.

STRAWBERRIES.

The list grown the past season comprises 86 varieties, the majority of which are of comparatively recent introduction, a few of them having fruited on the Station grounds but a single season. Following is the record made up at the time of fruiting. A few of the newer ones are spoken of in detail, while the entire list may be found in the following table:

LIST OF SOME OF THE NEW VARIETIES.

Afton (P*).—This variety originated in New York, and has fruited four seasons. It is one of the earliest to ripen, of good size and quality, but lacks productiveness and vigor of plant.

Alice (P).—This was received from S. B. Christian, Bradford, Ohio, in the spring of 1896, and consequently has fruited but two seasons. If, however, it continues to do as well as it has thus far, it will have a place on the permanent list. The fruit is large, regular, of good quality and productive enough for either a family or market berry.

Allen's No. 1 (P).—This comes from Maryland. It ripens a little before Auburn and is better than that variety, both in quality and productiveness.

Annie Laurie (B).—Matthew Crawford sent us this variety, but, unlike most of his productions, it has never borne any fruit worth mentioning. We have discarded it.

Auburn (P).—Originated in New York. The plant is vigorous and moderately productive, but it ripens in mid-season and is no better than many others.

Beauty (P).—This is another of Mr. Christian's productions, and it is one that will undoubtedly give good satisfaction over a wide range of soils and climate.

Belt (P).—This comes from Ohio and is quite generally recommended. If given high cultivation and fertilization, it is a good variety to grow for the fancy market.

Beverly (B).—This originated in Massachusetts, and is one of the earliest to ripen, vigorous and productive; fruit large, very firm and of good quality.

Bird (B).—Originated in Massachusetts, and has fruited four years,

* "P" indicates pistillate and "B" bisexual or perfect flowers.

giving good satisfaction each year. It is among the first to ripen; plant quite vigorous, and produces a good crop of medium sized, moderately firm berries of good quality. It will make a desirable berry for the home garden.

Brandywine (B).—As grown in hills, it produces a magnificent crop of fine berries. The fruit is regular in shape, of large size and good quality, and ought to stand shipping fairly well.

Clyde (B).—Originated in Kansas and has fruited on our grounds four seasons. It is unquestionably the most prolific variety we have growing at the present time, producing this season 420 bushels per acre. The plant is large and vigorous and ought to be grown in hills or kept thinned in order to prevent the plants becoming too thick. So far it has not been attacked by rust. The fruit is medium to large, rather light colored, and glassy in appearance, begins ripening early and continues, under good treatment, to the end of the season.

Cyclone (B).—We have fruited this two seasons, and so far have found nothing to recommend it over many other varieties.

Eleanor (B).—Has been somewhat disappointing in its behavior here, although it is spoken of very highly by eastern growers. It ripens early, fruit medium in size, bright red color, but the plant is not productive enough.

Ella (B).—Came to us from Washington, D. C., and was said to be one of the best very early varieties. It is very early in ripening, but that is all that can be said in its favor. The fruit is small and the plant unproductive. Discarded.

Epping (P).—This is a New Hampshire berry, and for the past three seasons it has shown many good qualities. It is among the earliest to ripen, the plant is vigorous and productive, the berry medium in size, good quality and moderately firm.

Fairmount (B).—Is another early variety, originating in New Jersey. The plant is much like the Epping in vigor and productiveness, and the berry is of fair size, of good quality and firm enough for shipping.

Gladys (P).—An Ohio variety, sent us by S. B. Christian, of Bradford, Ohio. Judging from two seasons' trial, I would place it in the front rank among the newer varieties. The plant is very vigorous, almost too much so, in fact, and bears a heavy crop of large, even shaped berries.

Hoosier (B).—Originated in Delaware County, Indiana, by Mr. Ran Beuoy, and is claimed by him to be a rival of the Brunett. It has fruited here two seasons and has shown some very good features, both in productiveness and quality.

Howard (P).—This is an Indiana variety, originating in Howard County, and while it does not ripen quite as early as some, the plant is very healthy and vigorous and produces a fine crop of large, firm berries of good quality, making it a desirable variety for either the home or market garden.

Hull's No. 3 (P).—This was sent us by the originator, Mr. E. J. Hull, of Oliphant, Pa. While it has shown some good qualities, it could hardly be recommended over many of those already mentioned. It has not proven to be productive enough for a market berry.

Jerry Rusk (B).—Last year Jerry Rusk began to attract the attention of visitors, owing to its large size and fine appearance generally. This season it has proven that at least a good portion of the praise bestowed upon it by Mr. Beuoy, the originator, was merited. The plant is strong and healthy and the fruit remarkably large and fine in appearance and of good quality.

Margaret (B).—This is another of Matthew Crawford's seedlings, and a much better one in every respect than the one previously mentioned. It is medium to late in ripening, fruit large and fine. The plant is a healthy, vigorous grower.

Marguerite (P).—In some of the price lists sent out by growers, I notice that this variety, or rather the name, has become confused with Mr. Crawford's "Margaret." This variety originated on the farm of J. C. Grossman, in Lagrange County, Indiana, in the spring of 1893, and Mr. Grossman informs me that he named it for his sister, he not having heard of "Margaret" at that time. As will be seen, they are two entirely distinct varieties, the one having a perfect blossom and the other an imperfect one. "Marguerite" is said to be a seedling of Jewell, fertilized by Jessie, and it possesses many of the good characters of both. It is a vigorous grower, and bears heavy crops of large, fine berries, which sell well on any market.

Marshall (B).—This variety has been having a great boom in some sections, but as we have it growing alongside of Brandywine it does not equal that variety in any particular, unless it is in size. With us it is a very shy bearer.

'96 (B).—This is another Hoosier seedling of considerable promise. It was originated by Mr. Beuoy, in Delaware County, and has been fruited here but a single season. The plant is quite vigorous and productive, berries medium in size and of fair quality. It does not seem to possess as many good qualities as the Hoosier.

Perfection (B).—In the spring of 1896 this variety was received from Geo. F. Newton, St. Joseph County, Indiana, where it originated. It has fruited here but two seasons, but gives promise of becoming a standard variety. The plant is quite vigorous, free from rust, and quite productive. The fruit is of medium size, of good quality and firm enough for a market berry. As the last season was unusually favorable for the development of the strawberry, it will perhaps be best to wait another year before recommending it too highly.

Reihl's No. 5 (B).—Was received from the originator near Alton, Illinois, in the spring of 1895, and while it has done fairly well, it has not proved to be superior to many other varieties grown in the same field.

Ridgeway (B).—Originated near Wabash, Indiana, and is certainly a very promising berry. A case of these berries was shown at the summer meeting of the Indiana Horticultural Society, in 1897, and was pronounced by a good authority to be the finest crate of berries he had ever seen. We have fruited it but a single season.

Superb (B).—This is another of the Ohio seedlings sent us by Mr. Christian, of Ohio, in 1896. It is by far the most promising variety of the lot, being of good size, shape and quality, and quite productive. The berry is also firm enough to ship well.

The following table gives in condensed form information concerning the varieties tested. They are graded on a scale from 0 to 10, the latter number being perfect. The size of the berry is indicated by "L" for large, "M" for medium and "S" for small.

TABLE OF VARIETIES OF STRAWBERRIES.

VARIETY.	Sex.	Originated in.	First Ripe.	Vigor of Plant.	Productiveness.	Size.	Quality.	Firmness.
Afton	P	N. Y.	June 2	7	8	l	9	8
Alabama	P	Ala.	June 2	8	8	m	8	7
Allice	P	Ohio	June 5	8	8	l	8	8
Auburn	P	N. Y.	June 5	9	8	m	8	8
Allen's No. 1	P	Md.	June 1	8	8	m	8	8
Annie Laurie	B	Ohio	June 7	9	5	l	8	9
Beauty	B	Ohio	June 2	9	9	l	8	8
Bedar Wood	P	Ill.	May 26	9	8	m	8	8
Belt (Wm.)	B	Ohio	June 4	9	9	l	8	9
Beverly	B	Mass.	May 27	8	9	l	8	9
Bird	B	Mass.	June 2	9	8	l	9	8
Blonde	P	Ind.	May 30	10	9	l	9	9
Boynton	P	Ohio	May 25	9	9	m	9	7
Brandywine	P	Ind. . . .	June 1	9	9	l	9	8
Brunett	B	Ind.	May 31	10	9	l	10	8
Bubaeh	P	Ill.	May 30	10	10	l	8	7
Clark	P	Md.	May 27	9	3	m	9	7
Clyde	P	Kan.	May 30	10	10	l	9	9
Crescent	P	Conn.	May 30	9	9	m	8	10
Cumberland	B	Penn.	June 3	8	7	l	9	7
Cyclone	B	Ind.	May 28	9	8	l	9	8
Dayton	P	Ohio	May 30	7	7	s	8	7
Dutter	P	Ind.	June 3	7	7	s	7	7
Eclipse	P	Div. Pom.	May 27	9	9	m	8	8
Edgar Queen	P	Ill.	June 2	10	8	l	8	9
Eleanor	B	N. J.	June 4	9	7	l	9	9
Elia	P	N. H. . . .	May 25	8	6	s	7	8
Epping	P	Ohio	May 29	8	9	m	9	9
Eureka	P	Ohio	May 30	10	10	l	8	9
Eva	B	Ind.	May 30	8	7	s	8	7
Fairmount	B	N. J.	June 2	9	8	m	9	8
Fancy	P	Ind.	June 1	10	8	m	9	8
Farnsworth	P	Ohio	June 3	9	9	m	8	8
Feicht's No. 2	P	Ind.	June 4	8	7	m	8	8
Gandy	B	N. J.	June 8	9	9	l	9	10

TABLE OF VARIETIES OF STRAWBERRIES—Continued.

VARIETY.	Sex.	Origin.	First Ripe.	Vigor of Plant.	Productiveness.	Size.	Quality.	Firmness.
Gladys	P	Ohio	June 1	10	9	l	10	9
Gov. Hoard	B	Wis.	June 3	10	8	l	9	9
Green Prolific	P	N. J.	June 1	10	8	l	8	9
Greenville	P	Ohio	May 28	10	10	l	9	9
Haverland	P	N. J.	May 26	10	10	l	8	8
Hoosier	B	Ind.	May 30	10	9	l	10	8
Howard	B	Ind.	June 1	10	8	l	9	9
Hull's No. 3	P	Pa.	June 4	8	8	l	9	8
Huntsman	B	Mo.	June 6	9	8	m	8	8
Jay Gould	P	.....	June 5	8	8	l	9	8
Jerry Rusk	B	Ind.	June 8	10	10	l	9	9
Jessie	B	Wis.	May 26	10	8	l	9	9
Katie	B	Ind.	May 29	9	8	l	10	8
Lady Rusk	P	Ill.	May 27	9	8	m	8	8
Leader	B	Ohio	May 25	8	8	l	8	8
Louden	B	Ill.	June 3	10	8	l	9	9
Louise	P	N. Y.	June 2	9	9	m	8	9
Lovett	B	N. J.	May 30	10	8	l	9	9
Margaret	B	Ohio	June 2	9	8	m	9	9
Marguerite	P	Ind.	June 3	10	9	l	9	9
Marshall	B	Minn.	June 3	9	8	l	9	8
Martha	B	Ind.	May 30	9	8	l	8	8
Melson	B	Minn.	June 5	7	8	l	9	9
Middlefield	P	Ohio	May 28	10	9	l	9	8
Muskingum	B	.....	May 28	10	8	l	10	8
'96	B	Ind.	May 30	10	9	m	9	8
Parker Earl	B	Texas	June 5	8	10	l	9	9
Pawnee	B	Ind.	May 29	10	9	l	9	9
Perfection	B	Ind.	June 2	9	9	m	9	9
Perkins No. 1	B	.....	June 4	8	8	l	8	9
Purdue	P	Ind.	June 2	10	10	l	9	9
Quality	B	Ohio	June 3	9	8	m	9	8
Reihl's No. 5	B	Ill.	June 1	9	8	m	8	8
Ridgeway	B	Ind.	May 28	10	10	l	9	9
Resser	P	Ohio	May 30	10	9	l	9	8
Saunders	B	Ont.	May 30	10	9	l	9	9
Shuster	P	N. J.	June 4	10	9	l	9	9
Splendid	B	Ill.	June 3	9	9	m	9	8
Stranger	B	Mich.	May 30	10	8	l	9	8
Supperb	B	Ohio	May 30	10	9	l	10	8
Sweetzer	B	Ind.	June 5	9	8	l	8	8
Timbrel	P	Ohio	June 6	10	8	l	7	9
Topeka	P	Kan.	June 6	8	7	m	8	8
VanDeman	B	Ark.	May 24	8	8	m	8	8
Warfield	P	Ill.	May 26	10	10	m	10	9
West Lawn	P	Ark.	May 28	8	8	m	8	9
Williams	B	Ohio	June 4	9	8	l	9	8

RASPBERRIES.

Seldom do we have a more favorable season for raspberries than was the one just passed. Timely rains kept the plants in thriving condition and enabled the fruit to grow to perfection. The varieties given in this list were all set in the spring of 1896. The plants were given ordinary care, such as any up-to-date cultivator would give his plants, except that the land was subsoiled to the depth of 14 inches before the plants were set. The effect of this was very noticeable on the growth of the plants the first season, and I am more convinced than ever that on land with a hard, compact subsoil no treatment will give better returns than a good, thorough subsoiling before setting the plants.

The majority of the varieties given here are of comparatively recent introduction, although a few of the older ones are grown for comparison. Thirty varieties were fruited the past season.

Columbian and Shaffer are made up on the same plan; both originated in New York, both bear purple fruit, both produce large and productive canes, which propagate from the tips. The Columbian, however, seems to be somewhat hardier and less susceptible to anthracnose than Shaffer. On this account it is preferable for general planting.

Louden is a good berry, but not early. The berries are not as large as Cuthbert, but will carry better.

Among the newer blackcaps we have found nothing that will surpass the Conrath for size and earliness, and the Kansas and Eureka for the general crop.

A new variety sent us from New York, called Black Diamond, fruited for the first time last season, and in point of size and productiveness it was fully equal to Kansas. It seems to be a very promising variety.

Fig. 17 show a box of Columbian.

Alpha and Munger fruited this season for the first time. They are both of Ohio origin and promise to become valuable additions to our list of blackcaps.

In the following table the scale is used in marking as is used in the table of strawberries. The form is indicated as follows: "r," round; "c," conical; "o," ovate.

TABLE OF VARIETIES OF RASPBERRIES.

VARIETY.	First Ripe.	Last Picking.	Vigor of Plant.	Hardi- ness.	Produce- tiveness.	Size.	Form.	Quality.
<i>Rubus Neglectus Class.</i>								
Caroline	6-17	7-20	9	10	9	m	r	8
Columbian	6-18	7-10	10	10	10	l	ro	9
Shaffer	6-20	7-8	10	9	10	l	ro	9
Reliance	6-14	7-8	9	10	9	m	r	9
<i>Rubus Strigosus Class.</i>								
Brandywine	6-12	7-2	10	10	8	m	ro	9
Cuthbert	6-20	7-10	10	10	10	l	ro	9
Golden Queen	6-15	7-6	10	10	9	l	ro	10
Louden	6-14	7-8	10	10	9	m	r	9
Marlboro	6-20	7-6	7	9	6	l	r	8
Miller	6-10	7-5	10	10	10	m	r	10
Ridgeway	6-15	7-6	9	10	9	l	o	9
Thompson's Early	6-10	7-1	9	10	9	m	r	9
Turner	6-14	7-1	9	10	8	s	r	8
<i>Rubus Occidentalis Class.</i>								
Black Diamond	6-18	7-8	10	10	10	l	r	10
Carman	6-15	7-4	8	9	7	m	r	8
Conrath	6-10	7-1	10	10	10	l	r	10
Earhart	6-16	7-1	9	10	8	m	r	9
Eureka (Mohler)	6-14	7-6	10	10	10	m	r	10
Gault	6-18	7-2	8	10	8	m	r	8
Gregg	6-20	7-10	9	9	9	l	r	9
Hilborn	6-15	7-2	10	10	10	m	r	8
Johnson	6-13	7-1	10	10	8	m	r	10
Kansas	6-15	7-5	10	10	10	l	r	9
Lovett	6-16	7-1	9	10	9	m	r	9
Nemaha	6-20	7-10	10	10	10	l	r	8
Ohio	6-15	7-1	10	10	8	m	r	9
Palmer (Aoma)	6-13	7-1	10	10	7	m	r	9
Pioneer (Progress)	6-13	7-1	10	10	9	l	ro	9
Souhegan	6-9	7-1	9	10	9	l	ro	9

The following is a good list for general cultivation, whether it be for home use or market: Miller, Cuthbert, Columbian, Golden Queen, Marlboro, Eureka, Kansas and Nemaha.

The Golden Queen is by far the best of the cream colored varieties.

BLACKBERRIES.

We are never quite sure of a full crop of blackberries until it is harvested, because, as a rule, a drouth begins about the time the berries begin to ripen, and this always proves fatal to the crop on soil underlain with gravel, as is the case with the Station farm. This season, however, there was a fairly good yield of most varieties. The following five varieties

fruited on our grounds for the first time this year: Austin's Improved Dewberry, Clark, Creviston, Piasa, Saunders' Early.

It will be seen from the following table of sixteen varieties that many of them score practically the same number of points, so that in selecting

TABLE OF VARIETIES OF BLACKBERRIES.

VARIETY.	First Ripe.	Last Picking.	Vigor of Plant.	Hardi- ness.	Produc- tiveness.	Size.	Quality.
<i>Rubus Villous.</i>							
Agawam	July 1	July 24	9	10	9	l	9
Ancient Briton	July 3	July 23	9	10	9	l	9
Early Harvest	June 25	July 12	7	5	6	s	9
Early King	June 28	July 10	8	8	7	l	9
Eldorado	July 6	July 25	10	10	10	m	10
Erle	July 5	July 23	10	9	9	l	10
Gainor	July 6	July 23	9	10	7	m	9
Kittatinny	July 3	July 20	10	10	8	l	9
Minnewaski	July 8	July 25	10	10	8	l	9
Ohmer	July 6	July 18	9	10	8	l	9
Snyder	July 5	July 20	10	10	10	m	9
Stone Hardy	July 8	July 20	9	9	7	m	8
Taylor	July 3	July 17	9	10	9	m	10
Wachusett	July 7	July 20	9	10	9	l	9
Western Triumph	July 7	July 20	10	10	10	m	9
DEWBERRIES.							
<i>Rubus Canadensis.</i>							
Austin	June 28	July 20	8	8	7	l	10
Lucretia	June 30	July 15	9	10	7	l	10

the best for any particular locality the list might be narrowed down to the following few varieties and the selections made from these: Agawam, Ancient Briton, Early King or Early Harvest (with protection), Eldorado, Erle, Snyder, Taylor and Western Triumph.

DECEIT IN BERRY BOX MEASURE.

Here I wish to add a word to the dealer, and through him to his patrons, whether they are growers or consumers. There is an old saying that "honesty is the best policy," and I have long been of the opinion that dealers as well as growers should adopt this policy, by adopting a uniform standard of measure in selling small fruits. It is no uncommon thing during the berry season to see wine measure and dry measure quart boxes placed side by side in the show windows of our groceries, and the customer paying the same price for each. It is also true that the grower who wishes to give full value for his money, and uses the full quart measure, does not

get any more per crate in the market than the man who uses the wine measure quart. There should be a difference in price, to the growers, and

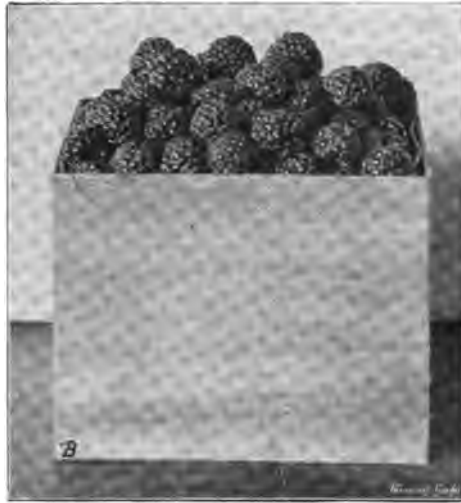


FIG. 17—BOX OF COLUMBIAN RASPBERRIES.

also to the consumers, and when consumers come to realize the fact that they are getting less for their money in one case than in the other there will be a revolution in the berry market, or rather in the berry box market.

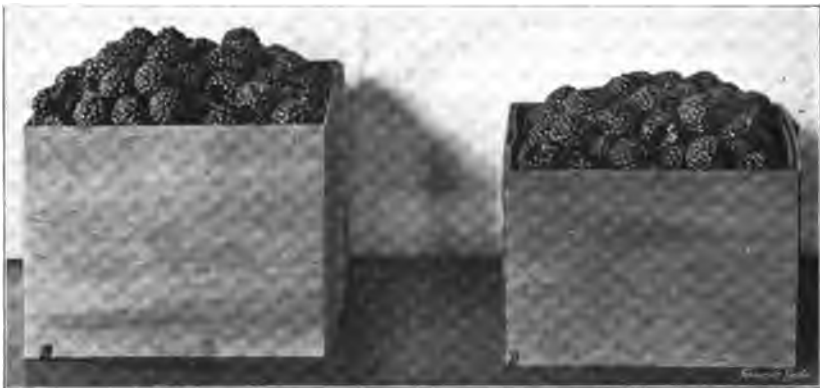


FIG. 19—THE TALLEST BOX REPRESENTS A STANDARD DRY QUART, THE SHORTEST, A WINE QUART.

The illustrations shown in Fig. 19 are made from photographs taken during the past berry season, and as they were both taken on one plate it will be seen that the comparison is correct. The box on the left is a full dry measure quart, while the one on the right is a wine measure quart. In order to show the difference in amount of fruit which each box holds, they were weighed separately, the full or honest quart weighing 24 ounces, while the wine quart weighed only 16 ounces, or just one-third less than the other. In buying two 16-quart crates of berries, therefore, the customer who buys the wine quart gets just $21\frac{1}{3}$ quarts dry measure.

GRAPES.

Our native varieties of grapes are adapted to a wide range of soil and climate. Like the strawberry, they will thrive upon almost any good soil, but it should be high, dry and well underdrained, either naturally or artificially. A southern slope is preferable, as the grape requires an abundance of warmth and sunshine in its development. For this reason, where the vines are trained to wire trellises, the rows should run north and south when possible, so as to give the vines the benefit of both the morning and afternoon sun. This will protect them in a large measure from the numerous fungous diseases to which grapes are subject. The black rot, downy mildew, anthracnose, etc., are much more prevalent in warm, moist situations than where the vines can have free access to the sun and air. It will not do however, to depend entirely upon these conditions to prevent the development and spread of these diseases. The spray pump, in some form, should find a place in every vineyard, be it large or small, and the Bordeaux mixture is a necessary accompaniment. It is a well-known fact, that when the vines are thoroughly sprayed with this mixture, once before the leaves start in the spring, and again just before blossoming, and once or twice later in the season, depending upon the humidity of the atmosphere, these fungous diseases will cause but very little trouble to the fruit, and the canes will be in much better condition to withstand the freezing weather of winter.

Our ten years' experience in growing nearly fifty varieties of grapes, proves that the vines should not be planted closer than 8x8 feet, for the slower growing varieties like Ulster or Nectar, while the larger and more vigorous growing varieties like Worden or Niagara will give better results if planted 12x12 feet.

While the greater portion of the varieties commonly grown are hardy enough to stand our ordinary winter weather without protection, still I have found that if the vines are protected ever so slightly after being laid down on the ground, the results obtained the succeeding season are much more satisfactory. I would therefore advise training the vines in such a manner that they may be easily laid flat upon the ground after the

pruning has been done late in the autumn. A few shovelfuls of soil thrown over them will furnish all the protection necessary. Leave them in this position until all danger of freezing weather is past.

In the recommended fruit list published last spring by the Indiana Horticultural Society for each of the ninety-two counties in the State, there are forty-four varieties of grapes, viz.: Agawam, Brighton, Brilliant, Catawba, Champion, Clinton, Cottage, Concord, Cynthiana, Delaware, Delaware Improved, Diamond, Duchess, Early Ohio, Eaton, Elvira, Empire State, Essex, Green Mountain, Hartford, Iona, Isabella, Ives, Jefferson, Lady, Leader, Lindley, Martha, Massasoit, Mo. Riesling, Moore's Early, Moyer, Niagara, Norton's Va., Perkins, Pocklington, Prentiss, Salem, Victor, Vergennes, Wilder, Woodruff, Worden, Wyoming.

The fifty varieties grown on the experimental grounds cover nearly all of this list with some additions of the newer varieties. Although varieties differ to some extent in their adaptability to different soils and conditions, it is a noticeable fact that the twelve varieties which appear the greatest number of times in the ninety-two lists mentioned above, are the varieties which have given the best results for the past ten years on our experimental grounds. The following is the list:—Black: Concord, Ives, Moore's Early, Worden. Red: Agawam, Brighton, Lindley, Salem. White: Diamond, Martha, Niagara, Pocklington.

Among the newer varieties worthy of consideration are—

Brilliant, a beautiful early red grape of good quality.

Campbell is said to be superior in every respect to Concord, but has not been tested sufficiently as yet to entitle it to that place.

Early Ohio promises to be a valuable addition to the early varieties.

Nectar resembles the Delaware somewhat in the character of vine and color of fruit. It is a desirable variety for home use.

Red Bird was received a few years ago from Mr. Munson, of Texas, and like many others of his production, it possesses many valuable qualities, both in vine and fruit. As the name indicates, the fruit is red, of good quality, and not susceptible to rot.

Ulster, while not a new variety, does not seem to have been planted as largely as its merits demand. It is one of the best of our red grapes.

In addition to the fifty named varieties, there are over fifty varieties of seedlings now growing upon the experimental grounds, and which will be of fruiting age next year.



PLATE I—A VASE OF STARRY GRASSWORT. ONE-THIRD NATURAL SIZE.

A NATIVE WHITE BEDDING PLANT—THE
STARRY GRASSWORT.

(*Cerastium arvense oblongifolium.*)

J. C. ARTHUR.

There are many wild plants that are passed by in daily walks that would make attractive and often notable additions to the flower garden or lawn, if given suitable culture and the right setting to display their charms. But the conditions under which they flourish in the wild state are so very unlike those into which they are generally thrust when brought to the garden, that the extent of their attractiveness before being molested is usually no criterion of the amount of beauty they will display under culture. It is, therefore, somewhat of the nature of a discovery to find a plant that has been unobserved, except as a part of the general wealth of indigenous vegetation, and yet proves to be of easy culture, and of pronounced decorative value.

In May, 1889, I picked up a little white flower growing near the roadside, some miles south of the village of Greensburg, Ind., preserving a small rooted specimen for my garden. It grew scatteringly among grass and low weeds in the somewhat protected neighborhood of trees and was wholly unobtrusive. There was no flaunting of color or massing for effect, in the manner that hepaticas, spring beauties and violets are wont to force admiration from the indifferent observer, neither was there a wealth of bloom, trussed or paniced on single stems, as in the case of the phloxes, the painted brush, and many later appearing flowers. It was a plant to attract the curious flower lover and the botanist (see plate 2), rather than the gardener or florist, and it was with no distinct idea of training it up for a place in the garden or to challenge public favor, that a live root was carried away.

The little plant was put into soil again in a bed by the Station greenhouse, where it was by no means pampered, but had to contend with the rankness of geraniums and other common garden flowers. It took kindly to the change from the first, soon throwing up more flower stalks, and

even giving a small second crop of bloom in the fall. The plant took care of itself during the winter, and in the early spring following came out with many flower stalks and an increasing number of flowers, and it has flourished ever since, until its many charms and simple culture have made it seem worth while to introduce it to the flower-loving public, that designation probably including in some degree nearly every member of the commonwealth.

The plant in question appears to have received no name from the people at large, who are the only persons generally recognized as having the undisputed right and power to bestow names upon plants that will pass current for daily use. A less attractive and more common form of the plant is known as Field Chickweed; but any designation including the word weed would be an inevitable misnomer for a plant so delicate, trim and bright, as this one appears to be when placed under cultivation. The botanists call it *Cerastium arvense oblongifolium*, and this triple name holds the key to an interesting tale of relationship, which it will be well to glance at later. If I were privileged to name the plant, I believe I should call it the Starry Grasswort, but I do not insist that this shall be its name, although for the sake of convenience, it may be well to use it in this article. I think that it will not be denied that its clear white, ten-rayed flowers are, in Longfellow's language, "stars that in earth's firmament do shine;" while its ready adaptability to the conditions and appearances of turf-forming grasses, may well entitle it to be called "grasswort."

Under cultivation, the plant spreads out over the ground in a close mat of foliage, in a manner characteristic of many members of the pink family, to which our plant in fact belongs, as for instance the clove pink, which it furthermore resembles in remaining almost free of roots arising from the prostrate stems, making it possible readily to lift the whole plant from the soil, except at its central attachment. A single plant may cover an area of two feet or more in diameter. From this low-growing mat of branching stems, and narrow inch-long leaves, there arises in early spring a wealth of slender perpendicular stalks bearing a succession of symmetrical flowers, nearly a half inch in diameter. Each flower possesses five petals; but by the simple device of slitting each one through the middle from the top often almost down to the base, there is the appearance of ten petals, and the beauty of the flower is greatly enhanced. But the single flowers are too small and delicate to individually excite much attention; it is their abundance, and the brilliant, refined appearance of the mass that makes them notable.

The flower stalks begin to appear with the first warm days of spring, and a few flowers may open early in March, under a favoring shelter, where the encouraging warmth of the midday sun is not too quickly dissipated by the pitiless wind. Usually by the last of April, or first days of May, the whole area has burst into glory (see plate 4), not to wane for



PLATE 2—A PLANT OF STARRY GRASSWORT AS IT GROWS WILD.
Pen Sketch by W. S. Holdsworth from a Colored Drawing done from Nature.

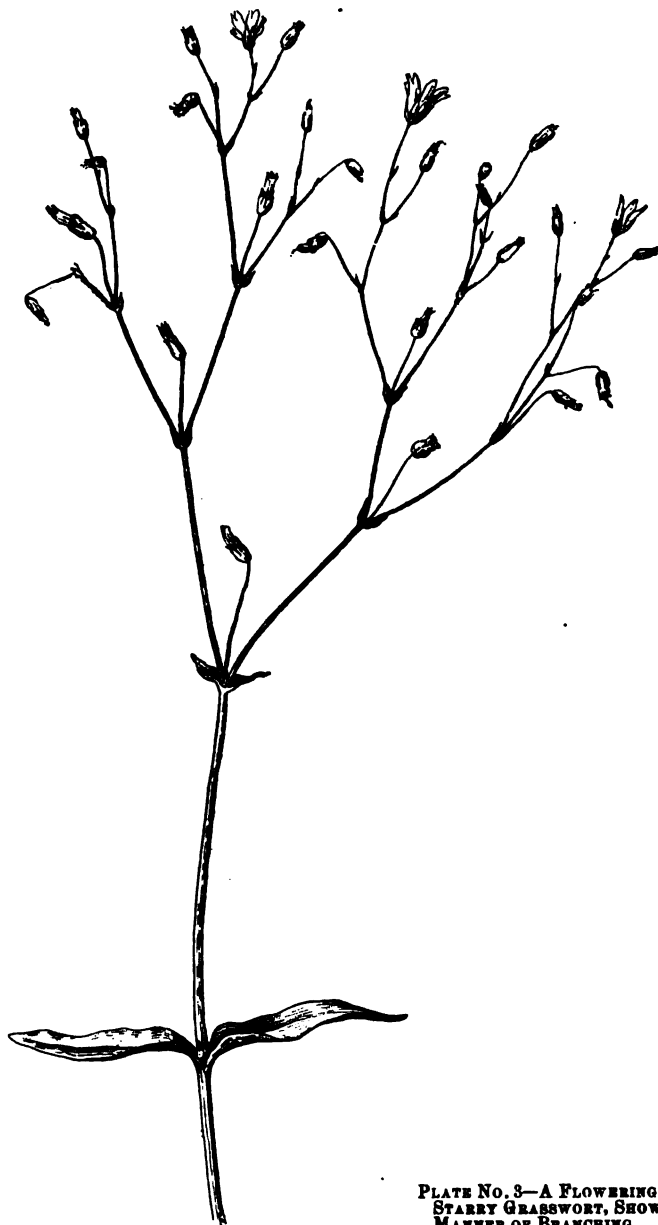


PLATE No. 3—A FLOWERING STEM OF
STARRY GRASSWORT, SHOWING THE
MANNER OF BRANCHING.

a month or more. After four to six weeks of dazzling whiteness, softened with the pale green of stems and leaves, the dry seedpods (see Fig. 20) become dominant, and the bed appears shabby. A few flowers will be produced almost the whole season through, sometimes becoming quite plentiful in the fall, but it is best to cut away the flower stalks as soon as they become unattractive.

Most bedding plants display no further charms when they have ceased blooming, but not so with the Starry Grasswort. A close carpet of green leaves lasts throughout the season, upon which other flowers may be ar-



FIG. 20—A SEED POD.

ranged to provide color. Any plants with foliage produced well above the ground, and not so dense as to interfere with the health of the Grasswort by excess of shade, may be set out at proper intervals over the bed. In this way attractive flowers that would otherwise show bare earth beneath them, are provided with a background that makes them more than usually effective. I have used for this purpose thrifty plants of Perennial Flax (see plate 5), started in the greenhouse, and turned out of thumb pots. The Flax soon starts into flower and makes a handsome display until late frosts. In airiness, height of plant, and flat-topped growth, the Flax is an especially appropriate successor to the Grasswort. Yet there are many other flowers that could be effectively used for such a purpose.

Even when the frost has cut down, and the tidy gardener has removed the last trace of flowering stems, our interesting Grasswort retains its ground covering of matted foliage. All winter long the prostrate stems remain alive to their very tips, and the leaves maintain a summer-like appearance in spite of cold and sleet and alternations of temperature. This is done without assuming the indurated, polished look that we usually associate with evergreen foliage; and one is constantly surprised to find that when the snow blows or melts away, his bed of Grasswort is still the same green mass of leaves. The accumulation of melted snows into a layer of ice sometimes smothers out the plants or sears the surface portions, and some other untoward circumstances may cause winter-killing,

wholly or in part. Nevertheless, the plant is to be rated as a hardy evergreen. One winter, during the earlier part of its trial, the bed was covered with straw, under a mistaken notion that the tender looking plants would otherwise succumb to the cold; and they nearly all died. Doubtless a covering of leafless brush would be beneficial, as it would hold the snow, and in the absence of snow maintain a protecting layer of quiet air, and yet not wholly cut off the light from the green leaves.

And in the spring again, one will be surprised with the discovery of timidly opening flowers, almost before the snowdrop and crocus have dared come out. In this early blooming habit is readily recognized its relationship to the common Chickweed (*Stellaria media*), which in this latitude often opens its pretty but insignificant flowers on warm days in winter, especially toward spring, and in protected places, and in less rigid climates, blooms the whole year round.

The value of our Grasswort is not confined to its use as a bedder. It serves many good purposes as a cut flower. It is pretty in a vase by itself (see plate 1), and is especially suitable to heighten the charms of other flowers, or to form a chaste bouquet with dainty ferns, smilax or asparagus. It will keep fresh in water for a surprisingly long time, and were it not for its soft yielding stems, made the more difficult to handle by their very slight stickiness, the plant could not fail to become a great favorite for cut flowers. It demands careful manipulation.

Although the plant occurs wild from New York and Virginia to Indiana, Iowa, Minnesota and the Rocky Mountains, yet it is accounted rather rare. In Indiana it is recorded on the lists of the Indiana Biological Survey from Posey, Gibson, Franklin, Davis and Decatur counties, and may be confidently looked for almost throughout the southern half of the State, and it may occur northward. It has been suggested by Professors Hollick and Britton, who made quite a thorough study some ten years ago of the relationship and distribution of the plant, that the presence of considerable magnesia in the soil may be an essential factor for its natural development, and to some extent determine the range. It is most frequently found in the vicinity of serpentine rock or dolomitic limestone, both of which are highly magnesian; and furthermore, the ash of the plant, as determined at the School of Mines in New York City, contains nearly 20 per cent. of magnesia, which is from two to four or more times as much as most common plants possess.

The plant was first detected on May 8, 1820, at Sandusky, Ohio, by the naturalist of an exploring expedition, and was described two years later by Dr. Torrey in the American Journal of Science. He did not give it a specific name, however, until he published his flora of New York in 1843, when he called it *Cerastium oblongifolium*. In the study by Hollick and Britton, already referred to, it was shown that this supposed species is doubtless a peculiar form modified by climate, soil, etc. of a widely distributed species, the Field Chickweed (*Cerastium arvense*), already spoken

of, which is a common weed in northern Europe and Asia, and in this country extends from the Atlantic to the Pacific, only being absent from the more southern States and the tropical and semi-tropical regions in Central and South America. The authors furthermore set forth that there are other forms or races, heretofore considered independent species, that are only offshoots, or extreme variations of this cosmopolitan and variable Chickweed (see plate 6), part of which are smaller arctic or alpine forms, and part have more ample development and a more southern range. Of the latter, our Grasswort has the widest distribution, but a Californian variety grows taller, and has larger flowers and leaves, and might possibly make a more acceptable garden plant.

The object in mentioning these wild varieties is to call attention to the probability that our plant possesses the necessary capacity for variation, that all writers now assume to be essential when rapid cultural improvement is demanded. The Starry Grasswort belongs to a genus with many species, fifty or more in fact, and to a species with a number of varieties, and probably more yet to be recorded, and doubtless with much diversity of individual plants, to be disclosed when such shall have been searched for. The argument is well set forth in the writings of the late Dr. Sturtevant, formerly of the New York Station, and of Prof. Bailey of the Cornell Station, especially in his recent work on Plant-breeding, that with such indications of a natural tendency to variation, the cultivator can confidently expect to be able, under intelligent management, to bring the object of his care rapidly to a high state of desirable improvement. Our Grasswort is not to be looked upon, therefore, as in its final form, but as a happy beginning to a still more attractive state if it should meet with public favor. It is possible that even individual wild plants may yet be found that under culture may prove in some details better for the garden than the form now growing at the Station. There is also the possibility of introducing the larger Californian variety, or using that to cross with the one in hand. This improvement of varieties is a very fascinating pursuit to those having the taste for it, and the Starry Grasswort is a very promising subject.

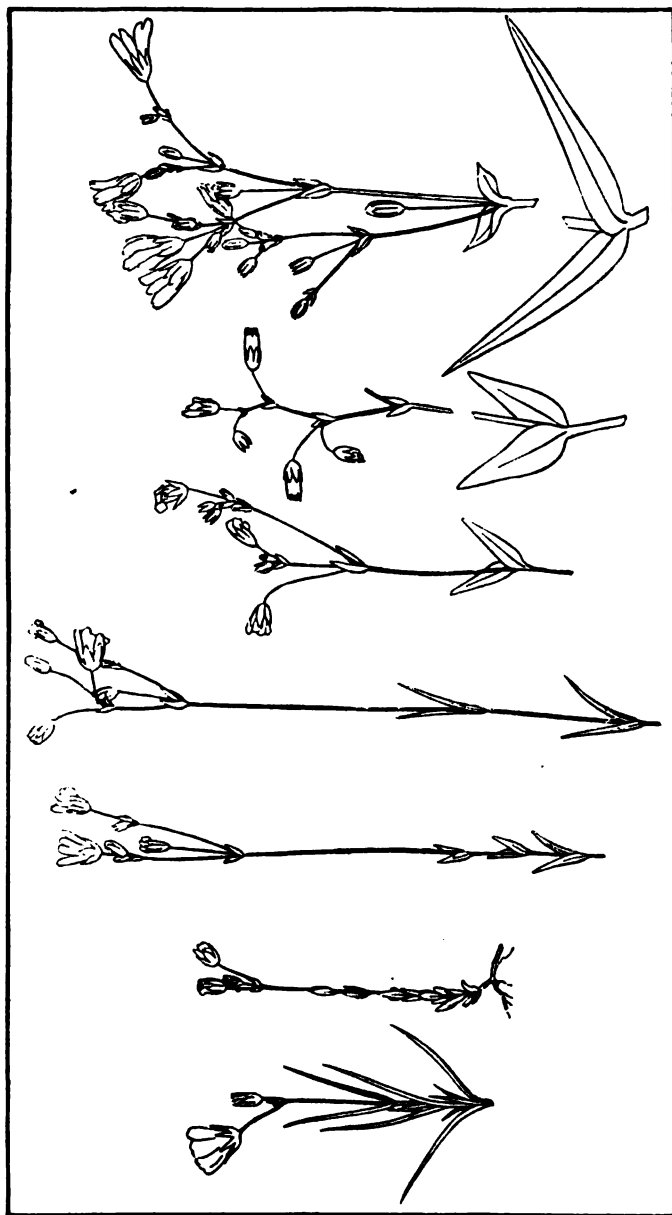
I now come to the part of this article which seems to me more important than what has preceded, and for which the part that has gone before may be taken as illustrative material. It is the suggestion that the lover of plants keep an outlook for desirable garden ornaments, and that trial be made of such as appear to have valuable qualities. But it is evident that showiness in the wild state is not the most important criterion by which to gauge the future culture value of a plant. One needs to have many factors in mind to meet with success, and it is hoped that the study of the Starry Grasswort will be suggestive in this line. The by-ways and fields undoubtedly hold many incipiently valuable decorative plants, which await the discoverer, as truly as do those of the unexplored regions of Africa and Asia.



PLATE 4—A BED OF STARRY GRASSWORT IN MAY, THE FOURTH YEAR AFTER BURNING FROM THE WOODS.



PLATE 5—PERENNIAL FLAX.
Planted on the Same Bed as Shown in Plate 4, with an Edging of Alternanthera, but Without Displacing the Starry
Grasswort. Photographed in September, 1886.



1 *O. arvensis angustifolium.*
 N. Asia and N. W. America.
 2 *O. arvensis angustifolium.*
 Fucianum. Colorado and Fucg a.
 3 *O. arvensis latifolium.*
 Alpine regions of N. hemisphere.
 4 *O. arvensis.*
 Typical. Near-ly cosmopoli-tan.
 5 *O. arvensis oblongifolium.*
 Northern United States.
 6 *O. arvensis velutina.*
 Pennsylvania.
 7 *O. arvensis maximum.*
 California.
 PLATE 6—Natural Varieties of the Starry Grasswort. Reproduced by Permission from the Bulletin Torrey Botanical Club, March, 1887.

REPORT

ON

FARMERS' INSTITUTES

*Under the Auspices of Purdue University School of Agriculture, for the
Institute Season of 1898-99.*

The Tenth Institute season opened November 28, 1898, and closed March 25, 1899. Every county in the State held an annual Institute. Several counties held second meetings and two counties held three meetings during the season. The record of the season is a good one, taken as a whole, as will be shown by the table of attendance. Some of the early December meetings, however, were not as largely attended as they should have been, due partly to lack of preparation, owing to the absorbing interest in the November elections, and partly to the unusually wet and backward fall, which delayed the gathering of the corn crop. Blizzards in January and February also reduced the attendance in several counties.

There is a steadily increasing demand for women workers, and the accompanying list of assigned speakers shows that more women were assigned to Institutes than in any preceding year. Judging from the few meetings that the Superintendent attended, and from the reports of others, the proportion of women and young people attending Institutes is steadily increasing. This is a very encouraging feature of the Institute work, and continued effort will be made to make the Institutes profitable alike to young and old of both sexes. A few Institutes held separate sessions for women the past season, but no systematic effort was made in this direction. The requests for Institute workers now coming in to the Superintendent's office show that women workers will be in even greater demand the next season. Most counties desiring such workers will provide for separate woman's sessions, and a systematic effort will be made by the general management to successfully inaugurate this feature of the Institute work, which has proved highly successful in other States.

The following list of Institutes held under State auspices during the current season gives the place and time of meeting and the speakers assigned to each in the order in which the several meetings were held:

**COMPLETE LIST OF FARMERS' INSTITUTES, HELD UNDER STATE
AUSPICES, FOR THE SEASON OF 1898-99.**

NOVEMBER.

PLACE OF MEETING.	DATE.	ASSIGNED SPEAKERS.
Harrison, Corydon	Nov. 28-29	J. Riley, E. H. Collins.
Lawrence, Bedford	Nov. 28-29	Mrs. J. W. Bates, E. Parr.
Warrick, Boonville	Nov. 28-29	S. H. Todd, Cal. Husselman.
Pike, Winslow	Nov. 28-29	Miss J. Rhodes, W. F. Brown.
Whitley, Columbia City	Nov. 28-29	Prof. Huston, Mrs. J. C. Erwin.
Clark, New Washington	Nov. 28-29	H. F. McMahan, Mrs. A. L. Smith.
Floyd, Edwardsville	Nov. 30-Dec.1	J. Riley, C. H. Collins.
Orange, Orleans	Nov. 30-Dec.1	Cal. Husselman, E. Parr.
Spencer, Chrisney	Nov. 30-Dec.1	S. H. Todd, J. H. Gwaltney.
Vanderburgh, School No. 1	Nov. 30-Dec.1	Miss J. Rhodes, W. F. Brown.
Noble, Albion	Nov. 30-Dec.1	F. VanAiken, Mrs. J. C. Erwin.
Crawford, English	Nov. 30-Dec.1	H. F. McMahan, Mrs. A. L. Smith.

DECEMBER.

Monroe, Bloomington	Dec. 2-3	W. F. Brown, J. Riley.
Perry, Tobinsport	Dec. 2-3	S. H. Todd, J. H. Gwaltney.
Daviess, Washington	Dec. 2-3	Mrs. A. L. Smith, E. H. Collins.
Dekalb, Corunna	Dec. 2-3	J. N. Babcock, Mrs. J. C. Erwin.
Scott, Scottsburg	Dec. 2-3	H. F. McMahan, J. J. W. Billingsley.
Jefferson, Kent	Dec. 5-6	Mrs. W. W. Stevens, H. W. Wiley.
Clay, Center Point	Dec. 5-6	S. H. Todd, D. B. Johnson.
Dearborn, Guilford	Dec. 5-6	Cal. Husselman, L. D. Creel.
Sullivan, Sullivan	Dec. 5-6	Mrs. A. L. Smith, J. Riley.
Newton, Goodland	Dec. 5-6	H. F. McMahan, O. F. Lane.
Fountain, Hillsboro	Dec. 5-6	Mrs. J. W. Bates, Prof. H. A. Huston.
Switzerland, Vevay	Dec. 7-8	Mrs. W. W. Stevens, C. Husselman.
Greene, Switz City	Dec. 7-8	S. H. Todd, D. B. Johnson.
Ripley, Osgood	Dec. 7-8	H. W. Wiley, L. D. Creel.
Dubois, Ireland	Dec. 7-8	J. H. Gwaltney, J. Riley.
Benton, Earl Park	Dec. 7-8	H. F. McMahan, O. F. Lane.
White, Monticello	Dec. 7-8	C. R. McKinney, Mrs. J. W. Bates.
Ohio, Mt. Pleasant Church	Dec. 9-10	Mrs. W. W. Stevens, C. Husselman.
Owen, Spencer	Dec. 9-10	S. H. Todd, D. B. Johnson.
Jennings, North Vernon	Dec. 9-10	H. W. Wiley, L. D. Creel.
Martin, Shoals	Dec. 9-10	Prof. W. C. Latta, J. Riley.
Parke, Rockville	Dec. 9-10	H. F. McMahan, O. F. Lane.
Warren, Williamsport	Dec. 9-10	C. R. McKinney, Mrs. J. W. Bates.
Cass, Logansport	Dec. 12-13	H. F. McMahan, Mrs. J. C. Erwin.
Carroll, Flora	Dec. 12-13	C. Husselman, G. G. Jenkins.
Decatur, Sardinia	Dec. 12-13	S. H. Todd, Mrs. J. W. Bates.
Johnson, Franklin	Dec. 12-13	J. C. Stevens, J. A. McFarlin.
Wabash, Wabash	Dec. 14-15	H. F. McMahan, C. Husselman.
Montgomery, Crawfordsville	Dec. 14-15	Mrs. J. C. Erwin, G. G. Jenkins.
Bartholomew, Hope	Dec. 14-15	S. H. Todd, Mrs. J. W. Bates.
Jay, Portland	Dec. 14-15	J. C. Stevens, J. A. McFarlin.
Grant, Marion	Dec. 16-17	H. F. McMahan, Cal. Husselman.
Vermillion, Cayuga	Dec. 16-17	Mrs. J. C. Erwin, G. G. Jenkins.
Shelby, Shelbyville	Dec. 16-17	S. H. Todd, Mrs. J. W. Bates.
Blackford, Hartford City	Dec. 16-17	Miss J. Rhodes, Prof. J. Troop.
Franklin, Brookville	Dec. 19-20	Mrs. J. C. Erwin, J. Riley.
Delaware, Muncie	Dec. 19-20	H. F. McMahan, Mrs. J. W. Bates.
Wayne, Fountain City	Dec. 21-22	Mrs. J. C. Erwin, J. Riley.
Hamilton, Noblesville	Dec. 21-22	H. F. McMahan, Cal. Husselman.
Hendricks, Danville	Dec. 23-24	Cal. Husselman, H. F. McMahan.
Brown, Nashville	Dec. 27-28	Mrs. W. W. Stevens, C. Husselman.
Vigo, Terre Haute	Dec. 29-30	C. Husselman, Mrs. W. W. Stevens.

FARMERS' INSTITUTE—Continued.

JANUARY.

PLACE OF MEETING.	DATE.	ASSIGNED SPEAKERS.
Union, Liberty	Jan. 5-6	Mrs. J. C. Erwin, J. Riley.
Allen, Ft. Wayne	Jan. 9-10	Mrs. J. C. Erwin, C. M. Hobbs.
Pulaski, Star City	Jan. 9-10	J. Riley, H. F. McMahan.
Clark, Charlestown	Jan. 10-11	None.
Steuben, Angola	Jan. 11-12	Mrs. J. C. Erwin, H. F. McMahan.
Starke, Knox	Jan. 11-12	J. Riley, J. A. McFarlin.
Adams, Decatur	Jan. 13-14	Mrs. J. C. Erwin, H. F. McMahan.
Jasper, Rensselaer	Jan. 12-14	J. Riley, J. A. McFarlin.
Posey, Mt. Vernon	Jan. 16-17	T. B. Terry, T. E. Bowles.
Henry, New Castle	Jan. 16-17	Mrs. W. W. Stevens, C. Husselman.
Jackson, Seymour	Jan. 16-17	J. Riley, H. L. Nowlin.
Laporte, Laporte	Jan. 16-17	H. H. Keim, H. F. McMahan.
Gibson, Princeton	Jan. 18-19	T. E. Bowles, T. B. Terry.
Randolph, Winchester	Jan. 18-19	Mrs. W. W. Stevens, C. Husselman.
Howard, Kokomo	Jan. 18-19	J. Riley, H. F. McMahan.
Porter, Valparaiso	Jan. 18-19	H. H. Keim, Mrs. J. C. Erwin.
Knox, Bicknell	Jan. 20-21	T. B. Terry, T. E. Bowles.
Hancock, Greenfield	Jan. 20-21	Mrs. W. W. Stevens, J. J. W. Billingsley.
Wells, Bluffton	Jan. 20-21	E. H. Collins, H. F. McMahan.
Kosciusko, Warsaw	Jan. 20-21	Prof. W. C. Latta, J. Riley.
Huntington, Huntington	Jan. 20-21	C. Husselman, H. H. Keim.
St. Joseph, South Bend	Jan. 23-24	Mrs. W. W. Stevens, J. Riley.
Lagrange, Lagrange	Jan. 23-24	H. F. McMahan, Cal. Husselman.
Lake, Crown Point	Jan. 25-26	H. F. McMahan, Mrs. W. W. Stevens.
Tippecanoe, Lafayette	Jan. 25-26	Mrs. J. C. Erwin, C. Husselman.
Fulton, Rochester	Jan. 27-28	Mrs. W. W. Stevens, H. F. McMahan.
Putnam, Greencastle	Jan. 27-28	Mrs. J. C. Erwin, Cal. Husselman.
Fayette, Connersville	Jan. 30-31	E. H. Collins, D. B. Johnson.

FEBRUARY.

Rush, Rushville	Feb. 1-2	E. H. Collins, D. B. Johnson.
Tipton, Tipton	Feb. 3-4	E. H. Collins, Prof. H. A. Huston.
Hamilton, Sheridan	Feb. 3-4	None.
Clinton, Frankfort	Feb. 6-7	H. F. McMahan, E. H. Collins.
Miami, Peru	Feb. 6-7	D. B. Johnson, G. G. Jenkins.
Boone, Lebanon	Feb. 8-9	H. F. McMahan, E. H. Collins.
Marshall, Plymouth	Feb. 8-9	D. B. Johnson, G. G. Jenkins.
Lawrence, Mitchell	Feb. 9	None.
Marion, New Augusta	Feb. 10-11	H. F. McMahan, Prof. C. S. Plumb.
Elkhart, Goshen	Feb. 10-11	D. B. Johnson, G. G. Jenkins.
Sullivan, New Lebanon	Feb. 10-11	Prof. W. C. Latta.
Madison, Anderson	Feb. 14-15	Mrs. J. C. Erwin, J. J. W. Billingsley.
Morgan, Mooresville	Feb. 16-17-18	Mrs. J. C. Erwin, Prof. W. C. Latta, J. J. W. Billingsley.
Jennings, Scipio	Feb. 17-18	Prof. J. Troop.
Johnson, Trafalgar	Feb. 21	J. J. W. Billingsley.
Dearborn, Wright's Corner	Feb. 23-24	Mrs. W. W. Stevens.
Warrick, Chandler	Feb. 24-25	Dr. S. H. Wolfe, Mrs. A. L. Smith.

MARCH.

Washington, Salem	March 10-11	Prof. W. C. Latta, Cal. Husselman.
Clark, Henryville	March 21-22	Prof. W. C. Latta.
Randolph, Farmland	March 24	Prof. H. A. Huston.
Randolph, Lynn	March 25	Prof. H. A. Huston.

The total number of Institutes held under State auspices during the current season was 103. If we add to this the number of independent Institutes already held and yet to be held before the end of the year, the total number would doubtless aggregate 125 or more. In view of the limited appropriation for Farmers' Institutes, this showing ought to be very gratifying to every loyal Hoosier.

The following table shows the average attendance at the several sessions of each annual Institute. No account is taken in this table of the attendance at the second or third meetings, as they were usually held at outlying points and the attendance was generally quite local:

TABLE SHOWING ATTENDANCE AT FARMERS' INSTITUTES.

COUNTY.	No. Sessions Held.	Average Attendance.	COUNTY.	No. Sessions Held.	Average Attendance.
Adams	5	205	Lawrence	5	39
Allen	5	199	Madison	5	339
Bartholomew	5	515	Marion	5	90
Benton	5	171	Marshall	5	310
Blackford	4	155	Martin	5	107
Boone	5	60	Miami	5	166
Brown	5	124	Monroe	5	131
Carroll	4	81	Montgomery	5	403
Cass	4	164	Morgan	5	289
Clark	5	100	Newton	5	97
Clay	5	192	Noble	5	285
Clinton	5	222	Ohio	5	83
Crawford	5	56	Orange	5	304
Daviess	4	335	Owen	4	122
Dearborn	5	100	Parke	5	260
Decatur	5	381	Perry	5	159
Dekalb	6	267	Pike	5	169
Delaware	4	89	Porter	5	142
Dubois	5	184	Posey	5	372
Elkhart	5	390	Pulaski	5	172
Fayette	5	145	Putnam	5	274
Floyd	5	50	Randolph	5	590
Fountain	5	143	Ripley	5	136
Franklin	5	272	Rush	5	178
Fulton	5	665	Scott	5	121
Gibson	5	185	Shelby	5	313
Grant	5	456	Spencer	5	183
Greene	5	45	Starke	5	108
Hamilton	5	315	St. Joseph	5	1,500
Hancock	5	257	Steenben	5	402
Harrison	5	190	Sullivan	5	98
Hendricks	4	267	Switzerland	5	259
Henry	5	735	Tippecanoe	4	261
Howard	5	260	Tipton	5	525
Huntington	4	561	Union	4	305
Jackson	5	152	Vanderburgh	6	195
Jasper	6	170	Vermillion	5	67
Jay	6	216	Vigo	4	205
Jefferson	5	201	Wabash	5	234
Jennings	5	46	Warren	5	60
Johnson	4	294	Warrick	5	163
Kosciusko	5	451	Washington	5	151
Knox	6	530	Wayne	5	420
Lagrange	5	609	Wells	5	466
Lake	5	227	White	4	66
Laporte	6	153	Whitley	5	146

General average	250
General average, 1894-95	118
General average, 1895-96	272
General average, 1896-97	232
General average, 1897-98	272

EXPENDITURES.

The following is a classified statement of disbursements of the Institute fund to the close of the Institute season, March 31, as taken from the books of the Superintendent of Institutes:

Bills of chairmen	\$2,091 75
Traveling expenses of assigned speakers.....	986 66
Per diem of assigned speakers.....	1,216 60
Stenographic and other clerical work.....	127 13
Printing and stationery	49 02
Postage	32 00
Supplies	2 35
Telegrams, freight and express.....	3 20
Membership fee International Association Institute	
Managers	10 00
Unexpended balance (April 1, 1899).....	481 29
Total	<u>\$5,000 00</u>

PUBLICATION OF INSTITUTE PAPERS.

Through the courtesy of the State Board of Agriculture the Institute management is again permitted to publish the papers of local workers in a number of the counties. These papers, which are forwarded by the several county chairmen, are published without abridgment or material change. They will no doubt prove very helpful to others in preparing papers for Farmers' Institutes. The publication of these papers has created an increased demand for the reports of the State Board of Agriculture and stimulated local workers in preparation for such work.

NEED OF AN ADVANCE IN INSTITUTE WORK.

In looking over the table of attendance and the averages for several years back, it will be seen that the attendance for the current season has fallen off somewhat. Several reasons for this decrease in attendance are given earlier in this report. The hindrances due to inclement weather and interest in other matters are likely to occur again. It seems necessary,

therefore, that the people of the State should become more deeply interested in the Institute work through a fuller realization of what it can accomplish for the betterment of agriculture. A careful perusal of the reports of the several meetings sent in by the secretaries and speakers shows that in many cases the poor attendance was due to lack of thorough preparation on the part of the local management. It is exceedingly important that the several chairmen take up the matter of preparing for their respective meetings at an early date and in a systematic and thorough-going manner. This is being done by many of the chairmen with most excellent results. Those whose meetings have not been very successful the past season are urged to inquire into the causes of their comparative lack of success and adopt methods that will secure a more widespread interest and larger attendance. The county chairmen should begin early to lay plans for the coming season in order that when the time comes everything may be in readiness for a successful meeting. It is high time that the most successful and practical farmers throughout the State should be enlisted in the Institute work, and it is believed that the county chairmen may, with a little solicitation, bring to their support the most successful stockmen, dairymen, farmers and fruit growers in their respective counties. It is difficult to maintain the interest from one annual meeting to another, and the chairmen are therefore urged to arrange for one or more independent meetings, holding the same at other points than the place of the annual Institute. Lake, Marshall, Noble, Whitley, Allen, Adams, Randolph, Delaware, Madison, Marlon, Huntington, Tippecanoe, Clark, Ripley, Dearborn and several other counties are holding such meetings with excellent results. Huntington and Tippecanoe counties each year hold some six or eight independent meetings at outlying points in the county, and are thus bringing the work within the reach of every farmer in the county. This is, of course, a labor of love, but it seems the only way of interesting the people generally in this work and of creating that spirit of friendliness and co-operation without which the highest success in agriculture will be impossible.

With the limited appropriation for this work, it seems that the general management can do little additional towards the improvement of the work without cutting down the direct allowance to the several counties. As it does not seem desirable to reduce this allowance for local expenses, the general management must be content to urge upon the several local managements more strenuous efforts in behalf of the work. It is the common experience of those who have been highly successful in holding Farmers' Institutes that they are well paid for their labor in the gratification of seeing the work move forward in a satisfactory manner. It would prove greatly helpful to local officers and workers if they would visit Institutes in adjoining counties whenever practicable. They would gather new ideas and much enthusiasm for the work.

PRACTICAL LINES OF WORK THAT MAY BE TAKEN UP.

There are many practical lines of work that may be taken up during the summer season with the view of reporting on same at the next annual Institute. This would give a freshness and practical character to the discussions at Institutes which would be interesting, instructive and highly profitable. To illustrate: Horticulturists might conduct experiments (1) with the various insecticides and fungicides; (2) with various mulches for small fruits; (3) in thinning orchard fruits, etc. The general farmers might report (1) experiments with varieties of grains, grasses and potatoes; (2) experiments in cultivating corn at different depths; (3) results with thick and thin stands of corn in wet and dry seasons; (4) methods of combating insect pests of the grain fields; (5) results with crop rotations; (6) tests with fertilizers and manures. Stockmen might report (1) results with various foods and food combinations for young and for fattening animals; (2) experiments to determine at what age and weight it is best to sell hogs to be slaughtered; (3) tests to determine the value of various leguminous crops, including the clovers, soy beans, cow peas, etc. Dairymen might report (1) effect of various foods upon the flavor and yield of milk and butter; (2) the best temperature for churning; (3) the comparative methods of gravity and centrifugal systems of creaming, etc.

The foregoing are simply illustrations of what might be taken up to be experimented with and reported upon. It might take an extra day or half day to hear these reports, but if the work being done is well advertised people will come out in increasing numbers and will be both interested and profited in hearing the reports of their brother farmers.

In addition to the above, every one who has achieved a notable success in some practical line, as fruit-growing, dairying, crop production or stock-raising, should be requested to give his experience for the benefit of others.

ACKNOWLEDGMENTS.

The undersigned takes pleasure in acknowledging with much appreciation the cordial attitude and active co-operation of the agricultural and newspaper press; the substantial assistance of the railroad companies in granting special rates to assigned speakers; the hearty co-operation of Institute officers and workers; the painstaking and earnest work of assigned speakers; the valuable assistance of business men of cities and towns; the generous attitude of church and school authorities in opening their buildings for Institute work, and the gratuitous services of members of the Experiment Station staff in attending Institutes.

W. C. LATTA,

Superintendent Farmers' Institutes.

Purdue University,

Lafayette, Ind., March 31, 1899.

THE FARM AND CROPS.

THE ATTRACTIONS OF FARM LIFE.

BY MRS ELIZABETH KIRBY BUNGER, ELLETTSVILLE.

[Read before the Monroe County Farmers' Institute.]

The attractions of farm life. They are so numerous that they make a pleasing subject for the genuine farmer to contemplate.

Independence in farm life is an attraction. No other vocation is so independent. The farmer possesses much personal freedom. He does not labor by the hour system, for his time is his own. If he desires to rest or visit, he can do so without a cessation of business; for his grass will continue to grow, his cattle to fatten and his grain to ripen.

Seclusion of country life is perfect happiness to some highly cultured individuals. They are free from the bustle of cities, noise of machinery, din of commerce and the literature that overtaxes the brain and injures the body.

Without interruption they can concentrate their thoughts on their business, deciding what would be the best financial venture in stock for their farms, or what would be the most profitable crops to produce. Also have ample time for keeping posted on current events and markets, and reading the latest books of history, fiction and poetry.

Some busy housewives enjoy seclusion. If they work systematically they have time for rest and recreation. Their afternoons are not all taken in making and receiving fashionable calls. Or they are not on the verge of nervous prostration by attending so many clubs and receptions. Neither are they annoyed by the next-door neighbor stepping in, unannounced, at all hours of the day. The week's washing can be hung where it can be bleached and purified by the sun and air, without fear of their observant neighbor counting the sheets, and commenting on the number of napkins.

Horticulture is a great attraction of farm life. To grow all varieties of perfect fruit is an art to be desired. The berries are sweeter plucked from the vines. How delicious the downy peaches and grapes, the luscious plums and other fruits gathered from the loaded branches! The farmer has for his table an abundance of the freshest vegetables and melons, the greatest variety of meats, the sweetest butter, the richest cream and the "newest" eggs.

Fine stock is a remunerative attraction. The noble horse, so good and patient to draw heavy loads, or turn the fertile soil, hitched to the family carriage, will quickly bring our city friends to the country.

A beautiful sight is a herd of thorough-bred cows, either the sensitive little Jersey, the Polled Angus, the Holstein or the all-around Shorthorn.

The hog, even, claims admiration; the finely formed, compact Berkshire, and the Poland-China, with his large amount of avoirdupois.

A flock of fine sheep eating grass on the hillside, and the playful lambs skipping over the rocks, make a lovely picture.

In the country the greenest grass is beneath our feet, the bluest sky is over our heads, the freshest air is ours to breathe, the purest water we have to drink, and the brightest sunshine to make all things around us beautiful.

The different seasons lend attractions not dreamed of by those who never lived in the country. After the long sleep of winter is broken, spring returns with its birds and blossoms. Then summer with its perfect June days, when the grass is green, the roses in bloom and all nature rejoicing in the luxuriance of light and life. Autumn comes with its ripened fruits and garnered grain. It is rich in coloring, beauty, falling nuts and Indian summer days. Old winter brings snow, and his icy breath tingles the cheeks and toes, putting new life in our girls and boys, who are never happier than when snowballing, skating or coasting. Whittier, when he wrote "Snowbound," had a true conception of the pleasures of winter.

Scenery is next considered. In the country it is varied, and all tastes can be gratified. The broad, fertile prairies covered with grain are fascinating to some people, while others prefer the scenes presented by a broken landscape of hills and valleys, creeks and winding roads. Once it was our good fortune to be a visitor in a country home surrounded by such scenery. The farm consisted of several hundred acres, some of it in a high state of cultivation, the stock well bred, the land productive and buildings commodious. On those lovely September mornings, soon after sunrise, we would sit on the long, broad porch, covered with vines; in front of the yard, filled with flowers, was the winding road; beyond the road an historic creek ran, overshadowed by beautiful trees. On its bank stood an old-time water mill, and its huge water-wheel lent an indescribable charm and melody to the enchanting scene. Spread out on the grassy hillside east of the house was the poultry, consisting of white Holland turkeys, white Brahma chickens, guineas and peafowls. Down the winding road, on their way to the pasture field, came the herd of black Polled Angus cows. Such beautiful creatures! Some of them crossed the creek on the bridge, while others waded across, stopping to drink. Away to the west the mountains loomed up in their grandeur. Dame Nature was in an extravagant mood when she lent assistance in so many ways. Such a picture was worth going many miles to see. Contentment and prosperity seemed to reign over it all.

In the country, between daybreak and sunrise, grand music can be heard. Choose a very still, clear morning, when every sound can be heard at a great distance. Then listen to birds singing, cattle lowing, sheep

bleating, a dog barking in the distance, a farmer calling his stock, chickens crowing, the rattle of a wagon perhaps a mile away, the low rumbling of some far-distant train, the busy hum of countless insects. It seems as if earth and air are filled with life and action. What a grand combination of sounds, and the perfect harmony of the whole!

Goldthwait wrote: "Ever remember that for health, and substantial wealth, for rare opportunities for self-improvement, for long life and real independence, farming is the best business in the world." It was Ruskin who wrote: "To watch the corn grow and blossom set, to draw hard breath over plowshare or spade, to read, to think, to love, to pray—these are the things that make men happy." Doubtless, when he wrote this, he had gone back to the green fields, the fresh air and lovely, restful country, glad to escape from the contaminating influences of an overcrowded city, and could heartily appreciate the "attractions of farm life."

THE FARMER NOW AND TEN YEARS AGO.

BY JOHN MERCHANT.

[Read at the Pike County Farmers' Institute.]

This story is characteristic of a once well-to-do farmer who gave his two sons his farm and in return they each were to pay him annually \$100 so long as he lived. John took charge of the entire farm of 240 acres, while his brother James was attending an agricultural school, who, after two years of faithful study, returned to take charge of his part of the farm of 120 acres.

His brother, after two years' successful farming, concluded to enter the mercantile business in a little near-by village. Accordingly he rented a business house and dwelling and moved to town, the father going with him to live a more quiet life, as he put it. Not having a sufficient amount of money to go into business, he placed a mortgage on his part of the farm for \$200, the father signing the mortgage to help John along. Everything went along nicely for a while, but presently he began to meet with reverses. Sales were slow, collections poor, rents went on and bill after bill became due; consequently he was compelled to borrow more money. The father, still wanting to help him, agreed to give him the \$100 due each year and also loaned him all the money he had. But at last note after note and bill after bill began to come due so fast that he could not even pay interest on his notes, much less meet his bills, so his creditors closed him out and the mortgagor took the farm and John was left destitute.

While James, on the other hand, with a two years' course in the agricultural school, had taken his part of the farm that his brother John had so unsuccessfully managed. James had not only made it productive, but profitable and pleasant; he had accumulated sufficient means to build a nice, comfortable home, a large basement barn, with plenty of stock, and an abundance of feed to feed them with. The father, seeing that he must seek another home, concluded to live with James on the old farm. He felt somewhat embarrassed, as he had criticized James pretty severely for spending money going to an agricultural school and often told him he was just throwing money away. He would say to James: "You was raised on a farm and you know how to farm, and what are you going to school for?" Then, in return, James would say: "I am going to school to learn the scientific principles of farming, as the time is soon coming when a farmer must know these things, that he may be able to meet competitors on an equal footing." The father would think of what he used to say about James, and wonder if he was wrong. Then, after pondering them in his mind for a while, say to himself: "I must have been wrong, but I don't like to admit it. James is getting along better than I used to, and there must be something in this college farming, and I am going to see about this. I am going to ask James some questions. I'll see what the college fellows know about farming." So he goes over to the old farm and James had just returned from a Farmers' Institute. James told his father what a nice time they had at the Institute and persuaded him to go along that afternoon. They went early and took a front seat, the father listening very attentively. When they had returned that night, and were comfortably sitting by a nice, bright fire, the father said to James: "What is this I hear these Institute fellows talking about scientific farming? Why, we never heard of such a thing when I was on the farm." "Well, father, these men are educated farmers—men who have studied the different elements in the soil that produce the different plants." "The different elements—what do you mean by the different elements? I can't understand." "Why, father, the ground contains certain ingredients, such as nitrogen, phosphate and potash. This is called plant food suitable to wheat, corn, potatoes and a great many other vegetables we raise on the farm, and we should be careful each year to return to our land just such vegetable matter as will be required for our crops." "Well, son, what would you want in the soil to raise good wheat, corn and potatoes?" "Well, for wheat the soil should be well supplied with nitrogen or ammonia; for corn there should be plenty of phosphate, and for potatoes a great deal of potash is necessary for their production; but it requires more or less of all of the properties to perfect the growth of either of these plants." "Then you would buy fertilizer like your brother John did and plant it along with your grain?" "No, sir, I would not buy commercial fertilizer, but I would raise all the clover I could along in my rotation, feed all the clover hay to stock on the farm during the winter, use all the straw for bedding my

stock, and you see by using straw for bedding I save all the liquid in the manure which is lost on many farms. Our scientific farmers tell us that the liquid contains three-fourths of the vegetable matter or more; then you see it is very important to save it all." "Well, I never thought clover amounted to much; it never did any good for me, and I never had time to haul manure—it wasn't worth hiring hauled. I used to give it to your Uncle James if he would haul it out of my way." "Yes, father, there is where Brother John missed it on the farm; he followed the old line of farming—sowed wheat and corn year after year and returned nothing to the soil, and consequently the land became exhausted of plant food or nearly so, and as a result he got a very small yield. Well, I remember he got seven bushels of wheat and twenty-five bushels of corn per acre the last year he was on the farm. Now, I have been here only eight years, and on the same ground I got thirty-seven bushels of wheat and sixty bushels of corn." "Now, son, I hear them speak of rotation farming. What do they mean by rotation farming?" "Well, father, rotation farming is planting a different crop each year for say about three years. Sometimes the rotation is longer, but I think in this country a three years' rotation is about right." "Son, what would you plant in a rotation, and what advantage would it be?" "I plant corn, then wheat, then clover—which I think is the best rotation for me, but some use potatoes instead of corn and others use tobacco, just to suit the market. There are several advantages in a rotation. First, we only have to break our ground every three years; second, the clover is a great fertilizer and leaves in the soil an abundance of plant food for the next two crops, which are corn and wheat. The third reason is that we get a better quality of grain in our rotation by planting the ground in corn, as it takes the element from the soil that produces so much straw in the wheat, hence we have a stiff straw and consequently a better grain." "When did these college fellows say was the best time to haul manure?" "That depends altogether on what crop is to be planted, but we are advised by the best authorities to haul manure out on the young clover as soon as wheat is taken off, and spread it evenly and nicely, and if there be any thin spot in the field, the manure should be spread there, which will help the young clover to get through the summer, and with our three years' rotation we have time to haul the manure, as we have no fall breaking to do, and by hauling the manure in summer and going directly on the young clover, it stimulates the clover to a more rapid growth, hence a greater amount of shade, which is very beneficial through the hot summer. Clover is a very important crop in our rotation, from the fact that it takes from the air a considerable amount of nitrogen, which is very important as a plant food." "Well, son, what is the use of spending so much money for tile, as you say you do? Why not plow your ground in small lands, leaving a furrow between each land to let the water off?" "Why, father, buying tile was one of my most paying investments; it has enabled me to harvest great crops

where, before I tilled it, I could scarcely get anything. I can plow my ground much earlier in the spring, and I can get the ground in better condition to plant my crops, especially in the spring of the year. When land is thoroughly tilled the ground becomes loose and lively, which makes the tillage more easy and therefore more profitable; tile is far ahead of bedding or furrowing, for several reasons. When we ridge up our ground we must leave furrows between the lands as we plow, hence a great loss in the furrows or ditches, which if tilled the land would be growing some crops instead of lying idle year after year. Then, on the other hand, the ditch system has many defects. The ditch so often fills with trash or some other obstruction, checks the flow of water and causes the water to back up nearly to the surface of the land, and, of course, checks the growth of the plant, while, if the same land had been properly tilled, there would have been no water near the surface to hinder the rapid growth of the plant. There is a great advantage in having both bottom and hill land thoroughly tilled." "Well, I don't see any use of so much harrowing, dragging and rolling of your land; you will wear it out." "Oh, that is very necessary to the growth of our crops. By thoroughly pulverizing the soil we liberate the plant food so the young plants can easily digest them, and besides this the fine roots can penetrate this fine mellow soil so much easier than if it was hard and lumpy. Not only this, but by making a fine seed bed we prepare the land for the next crop, which has its advantages."

"Well, well, this all seems like nonsense to me, but it may be all right. But nobody practiced it ten years ago."

TENANT FARMING, AND HOW TO IMPROVE IT.

BY JACOB CRONBACH, MT. VERNON.

[Read before Posey County Farmers' Institute.]

There is no subject which demands more attention from the farmers than tenant farming. Tenant farming can not exist without tenants, and tenants can not be without landlords.

Landlords and tenants are synonymous terms to capital and labor. Capital is valueless without labor, and labor can not exist without capital. So it is with landlords and tenants. Landlords with improved farms uncultivated derive not alone no income from the same, but have expense in connection with it. And the tenant without a farm to employ him must seek some other method of making a living.

Respect, confidence and good will must exist between landlord and tenant. Each must strive and be willing to benefit the other in any capacity within his power. Not alone must a willingness prevail to do this, but an anxiety to better and advance each other's interests. At all sea-

sons of the year, be it spring, summer, autumn or winter, plow up ill-feeling and discord. Kill all the weeds of discontent, deaden all strife and dissension, and in their places sow seeds of happiness, content and pleasure. Cultivate good feeling, good-fellowship, respect and honesty between each other. "Tenant Farming, and How to Improve It," can receive much benefit by heeding this advice.

In no place does that rule, "Do unto others as you would others should do unto you," come with more force, effect and necessity than in the relationship between landlord and tenant, and in no place is it more important and necessary. Again, I say tenant farming can receive more benefit, both landlord and tenant will be benefited, by a strict adherence to that good rule, which is old but true, of "Do unto others as you would others should do unto you."

Above all things, avoid that rule of "Do others, or others will do you." If that spirit or feeling exists between either landlord or tenant, wipe it out, or discontinue all business relations.

Tenant farming can be improved by carefulness on the part of the tenant in making a proper contract; but after once made, signed and agreed upon, no inducement should be great enough to break this agreement. Live up to it, and profit by your error. As a landlord, I can not too strongly condemn the practice of renting lands for a money consideration, nor can I say too much against an agreement to pay a specified amount of produce per acre. The only way to rent land is for a fractional part of the crop raised. I neither ask my tenants to insure me the works of God, nor do I ask them to guarantee me the prices of Chicago's bulls and bears. I do ask and want—yes, demand—my tenant to do his full duty. Be strictly honest with me, and when this is done, I am willing to share risks of weather and prices.

Tenant farming receives much benefit and improvement from good and suitable buildings for the family, for the stock, for the implements and for the products of the farm, also plenty of pure, lasting water. A loyal tenant is a good tenant—loyal to the landlord, loyal to the land he cultivates, loyal to the perishable improvements on the land and, above all, loyal to our country. Broad ideas, with broad treatment, produce broad results. The money I spend for the personal comforts of my tenants, such as interior painting and papering of the home, the building of cisterns, cellars and milkhouses, pays me better than any other money I spend. My tenants invariably give me two dollars' worth of work for every dollar expended in this manner.

Encourage the tenant to take proper and sufficient amusements. My tenants need enjoyments the same as I do. Overwork and overcrowding should be avoided, as should also loitering at the country grocery store, and holding stumps down. Proper and sufficient amusements are much better than improper and insufficient amusements, or none at all. No one need be ashamed of being a farmer. The people who try to ridicule and

belittle the farmer, and especially the poor, hard-working tenant-farmer, must be reminded that—

"God made the country,
Man made the town,
The devil made the hypocrite,
Who runs the farmer down."

HOME-MIXING OF FERTILIZERS.

BY H. S. WOLFE, M D., NEW ALBANY.

There are few subjects of greater importance to the farmer than the subject of fertilizers, and there is no division of this subject of greater practical interest than the mixing of fertilizers at home. There are used annually, in the State of Indiana alone, 49,400 tons of commercial fertilizers in their different forms. If only a small amount can be saved on the cost of each ton, or if only a little increase in value can be added to each, without increasing the price, the aggregate gained by the farmers of Indiana would amount to a considerable sum. To show how this can be done, and that much disappointment can also be avoided, by home mixing, is the purpose of this discussion.

Let us at the outset clearly understand what is meant by the term "fertilizer." There are many ingredients properly included in the term, but, as by far the largest number are contained in the soil in sufficient quantity to insure abundant crops, and are not offered for sale on the markets, all these are eliminated, and only three, namely, nitrogen, phosphoric acid and potash, will be considered within its meaning. By home-mixing of fertilizers, then, is meant the home-mixing of these three substances as they are contained in different forms and offered for sale on the general market. Nitrogen is estimated to be worth about seventeen cents per pound, available phosphoric acid six cents, and potash six cents per pound. Of course, these prices vary at different times and places.

PURCHASING FACTORY, MIXED FERTILIZERS DANGEROUS.

In the purchase of factory-mixed fertilizers the farmer is in danger of being deceived in many ways, and thereby induced to pay more for plant food than it is worth. In order, therefore, to appreciate the advantage of home-mixing, some knowledge of these dangers is important.

Farmers are often induced to pay high prices for phosphoric acid by the representation that the article offered is derived from "animal bone." It is quite common to hear the fertilizer dealer say that his goods are "bone" goods, and that he does not sell cheap "rock" at all, and this is

done often for the purpose of securing a higher price for phosphoric acid than it can be furnished for in the dissolved Tennessee or South Carolina phosphate rock.

Now, let it be understood that available phosphoric acid is the same thing, no matter from what source it is derived, and that it is worth just as much when derived from rock as when derived from bone, and also that the rock is a much cheaper source from which to get it, and it will be readily seen that the danger of the farmer being deceived here is very great, for it is true, doubtless, that very much of the phosphoric acid contained in factory-mixed fertilizers is derived from dissolved rock alone, and the claim that it is derived from bone is not true, but is set up for the purpose, only, of securing an unfair price.

DANGER OF PURCHASING INERT NITROGEN

Another danger of very great importance grows out of the difficult determination of the availability of nitrogen. There is a vast difference in the value of nitrogen as it is contained in different materials. Nitrogen in nitrates, and in ammonia salts, stands at the head of the list, and is valued at seventeen cents per pound, while nitrogen contained in hoof, horn, hair, wool waste and leather scrap is practically worthless as a fertilizer, because they decompose too slowly for it to become available for plant food in such articles. The difficulty of determining its availability is very great. The Vermont Station says: "Perhaps the most serious failure in analytical chemistry as applied to fertilizer inspection is the inability of chemists surely to distinguish between readily available and comparatively inert forms of organic nitrogen," and, "with a view of determining the presence or absence of leather, no certain test is known." The Ohio Station says that "hoofs, horns, hair and wool waste carry considerable percentages of nitrogen," and that "hoof meal is becoming a regular article of trade as a source of ammonia fertilizers; but in a single experiment made at this station on the wheat crop of 1896-7 hoof meal failed to produce any increase of crop, even when acidulated. Leather also shows a considerable percentage of nitrogen in the chemist's laboratory, but it decomposes so slowly in the soil as to be practically worthless." The difference in the value of nitrogen from different sources is therefore seen to be very great.

But it is so difficult for the chemist to tell the source and availability of nitrogen in ready-mixed fertilizers that no attempt is made to inform the farmer upon this important point. The degree of availability of phosphoric acid is given upon all the tags furnished by the State Chemist, but upon none of them is mention made of the availability of the nitrogen, an omission due to the fact that there is "no certain test" for this, the highest-priced constituent of commercial fertilizers, as contained in different materials.

Consider now the vast field from which valueless nitrogen may be drawn—the immense amount of hoofs, horns, hair, wool waste and leather scrap which are produced in this great country, and remember, too, that in this Yankee age nothing is permitted to go to waste, and some idea may be formed of the stupendous frauds farmers are in danger of having perpetuated on them when they buy factory-mixed fertilizers. It is not too much to say that almost all of this vast source of fraud is being utilized in the manufacture of fertilizers, and that the farmers are consequently paying out immense sums annually for nitrogen that is practically worthless to them. That these articles from which inert nitrogen is derived have “become a regular article of trade,” as stated by the Ohio Station, will hardly be disputed when all the facts are considered.

LOW PRICED GOODS FURNISH HIGH-PRICED PLANT FOOD.

The farmer is also in danger of paying too much for plant food when he buys low-priced mixed goods. There seems to be an impression among farmers that the lower the price per ton of ready-mixed fertilizers, the better the bargain they are securing. This in the very nature of business can never be true. It costs the same to mix, bag and sell a ton of inert, low-priced goods as it does to do the same in valuable, high-priced goods, and the freight and handling are the same. It is estimated by different experiment stations that have investigated the matter that these items constitute about one-third of the cost of ready-mixed fertilizers, all of which is charged up to the consumer. Now it is obvious that the more plant food contained in a ton, other things being equal, the cheaper the plant food will be. The manufacturer and dealer, however, seeing the farmers want low-priced fertilizers, are pushing them upon the market in great quantities, to the manifest injury of the purchaser.

In a recent bulletin from the Vermont Station it is stated that in an analysis of over one hundred different brands of fertilizers, “a dollar spent for average low-priced brands (below \$28) bought fifty-eight cents’ worth of plant food at retail seaboard prices; a dollar invested in average medium-grade goods (\$28 to \$32), sixty cents’ worth; and a dollar paid for average high-class goods (\$32.50 and upward), sixty-seven cents’ worth;” which shows the difference that might be expected, and also that in every instance the farmer pays too much for plant food by about one-third of the total cost in the very best of them, and only gets a fraction over half his dollar’s worth in some.

STILL ANOTHER DANGER.

Still another source of danger that confronts the farmer lies in the fact that the tags sent out by the State Chemist may be used on brands of fertilizers inferior to the ones represented by the tags. I do not state that this has ever been done, but only that it may be done. It can be

done by using the tags upon bags having no brand on them, or by re-sacking, as is often done when the bags are damaged by the fertilizer originally contained in them, and it is not unreasonable to suppose that such frauds are practiced by dealers who are dishonest enough to do it.

SAVING TO BE MADE BY HOME MIXING.

By purchasing the ingredients desired in a fertilizer, and mixing them at home, all the foregoing dangers may be avoided. There will be little danger of paying a higher price for phosphoric acid than its real market value, under the false pretense that it is derived from bone. Nor is there any danger of being deceived in the source or the availability of the nitrogen. In the purchase of nitrogen, phosphoric acid and potash, articles containing these three ingredients in the cheapest and most available form can be selected, and with ordinary care all danger of cheat in these, and also in low-priced goods, and in the fraudulent use of tags, can be safely guarded against, as well as all other hidden frauds and unnecessary expenses connected with the manufacture and sale of factory-mixed fertilizers.

SAVING BY BUYING WHAT IS NEEDED.

In some instances all three of the ingredients in a complete fertilizer are not needed or wanted, or, if needed at all, are wanted in quantities to suit a particular soil or crop. It would be a waste of money, for instance, to purchase nitrogen for any crop to be planted on a clover or cow-pea sod, and in some soils phosphoric acid or potash are not needed. By home-mixing, the ingredients needed can be combined to suit any given case, and thus by an intelligent selection no money need be wasted on articles not desired. The farmer simply buys what he wants, and nothing more, and thus a considerable saving in the cost of fertilizers may be made.

SAVING IN THE MONEY COST OF FERTILIZERS.

The saving in the money cost of fertilizers by home-mixing has been closely studied by several experiment stations, notably Ohio, New Jersey and Vermont, and all agree that much can be saved by the farmer in this way. The Ohio Station says that, a company of farmers buying together, "the final cost of their lot of fertilizers, including cost of materials, freight and mixing, was less by more than \$500 than the lowest price at which the company was offered an equal quantity of factory-mixed fertilizers of equivalent composition, and on the same terms of payment." The New Jersey Station gives figures which show that the selling price of factory-mixed goods in that State during six years, from 1891 to 1896, inclusive, was 36.9 per cent. higher than the station valuation, which means that over one-third of the whole cost of fertilizers was lost to the consumer. The Vermont Station gives figures which show that in 1897, in

134 samples of factory-mixed goods, and in six samples of home-mixed goods, one dollar bought in the home-mixed goods 97 cents' worth of plant food, while in the factory-mixed goods one dollar bought only 67 cents' worth. And in 1898, in eight samples of home-mixed goods, one dollar bought 81 cents' worth of plant food, while in 126 samples of factory-mixed, one dollar only bought 61 cents' worth. The station says "the saving was 45 per cent. in 1897 and 30 per cent. in 1898." I have been mixing for the past five years a fertilizer that cost me \$20 a ton, that analyzes in nitrogen and phosphoric acid about equal to the factory brands on my market, and from two to five times as high in potash. The factory brands retail at \$25 to \$28 per ton. The saving for the past five years has averaged fully \$7 per ton, buying my ingredients in my own market at retail prices. More could be saved by buying in large quantities or from first hands.

NOTHING LOST IN QUALITY.

Nothing need be lost in quality by home-mixing. Any one who can mix a feed for a cow, can, with a shovel and screen, or a smooth floor, mix fertilizers that will prove as efficient as any factory-mixed goods. This has been fully demonstrated by the Ohio Station, and also in my own experience. This station, after a number of careful tests, gives the average increase per acre from factory-mixed fertilizers at 3.94 bushels of grain, and 122 pounds of stover, and that of home-mixed fertilizers at 4.10 bushels of grain and 188 pounds of stover, and concludes "that in the general average the home mixtures gave quite as large an increase as did the factory-mixed fertilizers." There is no doubt in my mind, after many trials, as to the correctness of this conclusion.

FORMULA.

There are many combinations by which a cheap and efficient fertilizer can be mixed at home. The one I have used was recommended by Professor Massy, of the North Carolina Station, several years ago, and has been entirely satisfactory to me in all respects.

It is composed as follows:

- 1,200 lbs. acid phosphate (dissolved rock).
- 600 lbs. cottonseed meal.
- 200 lbs. muriate potash.

For special purposes, as for potatoes, gardening, etc., the following is recommended:

- 1,000 lbs. acid phosphate.
- 600 lbs. cottonseed meal.
- 400 lbs. muriate potash.

Of course, in making up a formula, the cheapest source of the three ingredients should be utilized. At this time acid phosphate is the cheapest source of phosphoric acid, cottonseed meal is the cheapest source of available nitrogen, and muriate of potash is the cheapest source of potash.

THE FERTILIZER DEALER.

There is no intention in the foregoing to disparage the fertilizer dealers. They are doubtless, as a rule, as honest and reliable as any other class of business men. The object is to warn the farmer of the danger of purchasing goods the composition of which he knows so little about, and to engage him in an earnest effort to induce the fertilizer dealer to keep and sell the article which he needs, and at a price that shall be fair to both the buyer and seller, so that he can mix a fertilizer at home that will be certainly reliable.

HOW TO GROW POTATOES.

BY DAVID MILLER, COLUMBIA CITY.

Read be'ore the Whitley County Farmers' Institute.

I will only attempt to tell how to grow potatoes. The first thing is to prepare the ground. This we look after two or three years previous to planting, as I prefer clover sod to plow under for potatoes. We manure heavily, to get a good growth of clover. In my experience clover is the crop to plow under for potatoes. If we fail to get a catch of clover, we manure ground intended for potatoes. As soon as we can after harvest we spread manure evenly so as to feed ground evenly. In spring, as soon as the ground is dry enough to work, we boat, harrow with smoothing harrow and rub and harrow land until manure is all pulverized, so it is almost invisible; we then plow deep. Follow right after plow, while ground is moist, with boat or harrow, or both, according to condition of ground. By thus doing we save all the plant food. We prefer planting as soon as possible after plowing. In case we get caught with a shower, we harrow ground again before planting. I do not take much stock in much work on ground before planting. This is about the amount of work we put on ground before marking for planting. We now mark our ground with shovel-plow with large shovel, mark deep rows north and south from three to three and one-half feet apart, cut seed to one eye in a piece, from well-selected tubers, large in size, smooth and clear from rough spots. Do not plant seed end as a rule; drop seed as soon as possible after ground is marked, while ground is damp; drop by hand in drill one piece at a place from twelve to fourteen inches apart. Plow shut as soon as possible with double tender. As soon as field is planted, go to working ground with smoothing harrow with teeth set at about half slant. After all showers we immediately work ground as soon as dry enough, with this tool. We work potatoes with this tool until four or five inches high. After this, work with fine spike-tooth harrow, with harrow teeth set deep.

In case we should get a beating rain we stir ground deep with cultivator, with very small shovels; follow right after with fine harrow. This we do until stalks are ten to twelve inches tall. After this we raise teeth so they will not run in ground over two inches deep. Work them after all rains as soon as dry enough; do not allow a crust to form on top of ground. This work we repeat until vines begin to turn yellow. Should there be any weeds, we pull them out, as they will take plant food from the potatoes. In regard to bugs—as soon as potatoes are out of ground we look after bugs; as soon as potatoes are up we hand-pick them; we pick them several times, after which we spray them. We use London purple. We have a barrel sprayer, with pump, two hose, one on either side. We place barrel on small slip made for the purpose; we hitch horse to boat and let him walk between rows. Spray both ways, so as to saturate stem of stalks. This is necessary about twice in the season. It is a benefit if there is not a bug in existence. Use four ounces of London purple to forty-five gallons of water. We have been successful with the purple.

CORN CULTURE FROM SEED TO CRIB, AND HOW TO GET THE MOST OUT OF IT.

BY T. F. M'CALLIE, NEWBERN.

[Read before Bartholomew County Farmers' Institute.]

As the question starts with the seed, and surely that is the most important part, our plan is to select the seed as we gather the crop. We fasten a small box on each wagon bed, and as we find a seed ear, place it in the box. We rick the ears up in the loft of some building on narrow strips of lumber. We usually leave it there until March or April, and on rainy days take it down, examine as to vitality of germ, rub and shell. So we are sure, when planting time comes, that we have plenty of good seed corn.

As to variety, we raise white, and the kind that will produce the most bushels of matured ear corn to the acre. We advocate and practice what we call deep breaking, eight or nine inches in bottom and gravel land, and five to seven inches in depth on clay and upland. For early planting we are not so particular that all clods shall be pulverized, but for later planting we are more particular to thoroughly prepare the land before planting. We advocate planting in a furrow. Our plan is to furrow ahead of slide drill, and we claim this plan has given the best results of any plan we have ever tried. Of course, it will be said this plan of planting will not pay—"I have not the team and help." We know it will pay, even to hire the ground furrowed at 15 cents per acre. It pays for time, it pays

for the stand, it pays in the cultivation, and it surely pays in the bushel.

We roll our corn before first plowing. We consider the first plowing of the greatest importance of any of the cultivations the crop may receive. Therefore, go slow and sure—usually about six acres per day for each double cultivator. Of course, we use the spring-tooth cultivator, and keep the points sharp, and cultivate as often and as long as possible.

Our plan of cribbing is one man to the wagon, husking two rows, with backboard on opposite side of wagon; sixty to seventy bushels is fair work. We consider this the only way for time and profit.

Corn culture from seed to crib, and how to get the most out of it. Well, this last part—how to get the most out of it—is the stickler to me, and, if I mistake not, for each farmer present. Our plan is to market the corn in the bushel. After we have economized in every way known to us in the production of the crop, one way to get the most out of the corn crop is to stay in the field six days in the week, and out of the buggy the same length of time, for surely the buggy is a poor tool with which to tend a crop of corn. We should know what the corn has cost us as it stands in the crib. It will be said, "How are we to know what the crop has cost us?" Easy enough. Keep account of all time spent on the crop, board of men and teams, implement expense, blacksmith bills, interest on teams, harness, implements, on buildings that corn is stored in, and interest on land and taxes. If there is anything left for the groceryman, the merchant, the doctor, etc., it is plain to be seen that to meet all the above, it will be necessary to get quite a good deal out of the corn crop. First, by being ready when the season comes, to begin operations and pushing everything in a business-like way, with the object in view all the time of producing the most bushels of corn to the acre; and with the thought always in mind of keeping down the expense. I do not mean not to hire needed help, for, a field neglected a few days will often reduce the yield ten bushels or more to the acre; but I do mean, stick to the corn field, and leave the circus, the races, etc., to take care of themselves—if we want to get the most out of the corn crop.

We should make an effort to market our corn where we can get the most out of it, for time and honest weights are two important factors when selling corn in the bushel.

We shall not touch on the fodder and stock side of the question.

Realizing the fact that presenting the question as we have will not meet the approval of all present, I now leave the question with you.

SMALL FRUITS FOR THE FARMER.

BY T. J. WEBB, ATTICA, INDIANA.

[Read before the Warren County Farmers' Institute.]

The subject assigned me readily divides itself into three topics—planting, culture and harvesting.

Planting includes selection, preparation and fertilization of the soil, as well as the choice of the different kinds of fruit to be raised.

We will first consider the strawberry, the soil for which should be one not too rich in natural humus. A knoll of clay loam would be preferable to a level plain of deep black soil.

Having selected such a piece of ground, cover it with well-decomposed barnyard or stable manure in the fall; then in the spring plow it under, following with a subsoller; then the harrow and pulverizer, when, if the ground is neither too wet nor too dry, you are ready to plant. And here it might be well to offer a word of caution: Don't rush out immediately after a shower to plant the strawberry, but wait until the ground will work nicely with the hoe or cultivator.

We, perhaps, have determined what varieties we are going to plant. If not, it must be done right now. When there are so many excellent varieties claiming our favor, this is a pretty hard question to settle. The Bubach and the Gandy make an excellent combination; also the Clyde and the Warfield. The Jessie and the Bederwood are good fertilizers for any of the pistillate plants and are also good producers of fine berries; and we must not omit the Brandywine and the Parker Earl. At least one row of fertilizers should be planted for every two rows of the pistillate kinds. Better results might be obtained by planting them alternately (in the same order) in the rows, but there are some objections to this method.

In setting the plants the greatest care must be taken to avoid planting either too deep or too shallow. If set too deep, a light shower might flood the crown of the plant with earth, which is fatal to it, or if too shallow the crown of the plant will be above the natural surface of the earth, and it will die for want of moisture. In order to get the plants at the proper depth, it is perhaps better to set altogether by line, avoiding marks or furrows of any kind. If one is planting for home use only, the rows need not be more than three feet apart, but if for market purposes, they should be from three and a half to four feet, giving more room for horse and cultivator.

The distance apart in the row depends upon what system one intends to follow. If the matted-row system is to be used, eighteen to twenty-

four inches will be close enough to set the plants. But if you want to adopt the single-plant method, and keep all runners cut off, they may be set as near together as twelve inches.

If your plants are well rooted, cut the ends off about one-third of their length, spread them out fan-shaped and press the earth firmly to the roots with the hand.

When your planting is done, you are very nearly ready to begin cultivating. A very few days will suffice to allow the roots to take hold of the earth and the leaves to freshen up. The work must not be postponed after the first shower falls on them, unless the rain is continuous. Perhaps the implement best suited to the purpose is the "Planet Junior" one-horse cultivator. It has the merit of stirring all the surface to the depth of from two to four inches without covering the plants, and here, as in planting, the earth must be kept off of the crown of the plants. The cultivating must be continued every few days, and especially after every shower, so that the weeds and grass will not have time to take root in your patch.

It is better to cut off the first set of runners that put out, even if you are going to adopt the matted row, as the plants will be stronger and the runners will not so soon get in the way of the cultivator. This work must be kept up with cultivator or hoe all through the growing season, and almost until the ground freezes, for the seeds of perennial weeds do not grow until late in the season, and if not destroyed will torment you in the spring by scattering their seed all over the ground before your berries are ripe.

For winter protection the most available material is clean wheat straw. By clean wheat straw is meant that it should be free from noxious weed seed, and if the straw is half decayed it is better than when fresh, for it will not be so easily moved by the wind, and will all the sooner decompose and be out of the way after cultivation. This should be applied as soon as the ground is frozen hard enough to bear a team, and be partly removed when you are sure that winter is past. Enough of the straw should be removed to expose the plants and allow them to grow, leaving the rest to keep the berries out of the dirt.

From thenceforth your success depends wholly upon the season. With growing weather until blooming time, then sunshine and honey bees, and afterwards a few warm showers, your vines will be full of luscious fruit. But if during the blooming season we have cold, wet weather, and few bees on the wing, the best thing you can look for is half a crop, and that of short duration.

If you grow berries for home use only, the good wife will see to it that they are gathered at the proper time and that none go to waste. But if you wish to put them on the market, procure new, clean baskets or boxes, full-quart size, and if possible have your pickers fill them with sound, bright berries until they are slightly rounded up in the middle,

with the berries standing on the calix or stem end. This turning the top course right side up is not deceiving or cheating your customer, but is simply doing the berries justice, allowing them to speak for themselves.

The ground for blackberries and raspberries need not be so rich but fertilizers will not hurt them. The rows should be from six to eight feet apart, and the plants the same distance in the row. The second year, when the canes begin to make a vigorous growth, they should be cut back to a height of from three to three and a half feet. They will then send out strong branches, which in turn should be cut back to ten or twelve inches. Cultivate the first year with plow and hoe, and afterward mulch with straw deep enough to smother all grass and weeds.

As to varieties, a few Hansel (red) are desirable, as they begin to ripen with the last of the strawberries. These are soon followed by the Marlboro, one of the best reds in cultivation.

The Mammoth Cluster and the Gregg are among the leading blackcap varieties. Shafer's Colossal is a large, purplish blackcap, and a very prolific bearer, not real hardy, but it might be grown successfully with winter protection.

The Snider blackberry will probably succeed in more places than any other variety.

Now a word about the larger fruits. It seems to be almost an established fact that the old varieties of apples that succeeded here so well thirty or forty years ago have run out and deteriorated until it is useless to plant them. A great many of the newer varieties are absolutely worthless. Yet there are apples that are doing well in other parts of the West and may do quite as well here. Of this class the Wolf River, Roman Stem, Gano, Grimes' Golden, Jonathan, Wealthy and York Imperial are among the best.

Plant a few of these, remembering that the old orchards were planted in a virgin soil, containing all the humus that nature had stored within it. Try to bring about the same conditions by fertilizing and subsoiling in your new orchard plat that existed in the old. Plant apples, plant peaches and pears, and you may have fruit from strawberries in June until strawberries come another June.

THE FARMER'S GARDEN.

BY MRS. WILLIAM HILTON.

[Read before the Jay County Farmers' Institute.]

Every farmer should have a good garden. Several things should be considered in first making a garden. It should be located as near the kitchen as possible; should be easy of access. It should be well fenced, so as to keep out poultry and pigs. The soil should be well underdrained

and made very rich. We prefer clay soil, well enriched with stable manure. And above all, be sure that you have good, fresh garden seeds, for if you plant inferior or stale seeds you will have a poor garden. The garden should be large enough to admit of a horse and plow, with plenty of room at each end to turn.

About half of the garden should be planted in small fruits, such as strawberries, currants and gooseberries. About the 15th of April, or before, if the ground is in proper condition, have a strip plowed wide enough to plant all the early, or hardy, vegetables you want, such as onions, radishes, lettuce, peas, etc. Harrow well, then mark off in beds with the plow, then rake off with garden rake, and you are ready to plant. In about three or four weeks later have another strip plowed and harrowed for tender vegetables, such as beans, beets, tomatoes, early cucumbers, peppers, sweet potatoes, etc. Tomatoes, peppers and early cabbage should be started in hotbeds, or in the house, about the first of March, or later. Now about late or winter cabbage: If you want any to bury for winter use, don't plant them too soon. I used to sow my late cabbage seeds when I planted my early vegetables, and the result was it all burst, and before time to bury winter cabbage it was all spoiled. The best time to sow your winter cabbage seeds is about the first of June; also be very sure you have good, pure, fresh seeds. The ground for late cabbage should be plowed some time in July. Last year we did not get our late cabbage set out until August 1, and the result was every stalk made a good head, scarcely any bursting. For the green worms that infest our cabbage I used to buy Persian Insect Powder; it will kill them, but is quite expensive. One of the most effectual remedies I ever tried was London purple; make a solution same as if you were going to spray plum trees, and spray them before they commence to head. This year we did not do anything, just let them eat, and they did not seem to do much harm. I believe that they are gradually passing away.

After the garden is made, and growing, keep the weeds down by hoeing and pulling by hand. Always try to hoe in the garden the next day after a rain; hoe everything then except beans; always hoe them in the evening, when the ground is dry. I would not advise taking a horse in the garden when the things are growing. I think that they do more harm than good, tramping on things. A wheel hoe is nice to hoe cabbage and tomatoes.

A good garden is one of the most important things on the farm. What a comfort it is to have nice, fresh fruit and vegetables (of our own raising) on our tables nearly every day in the year. We think that if the people would eat more fruit and vegetables instead of so much fat pork, we would not be called a nation of dyspeptics. However, strange as it seems, so few farmers have good gardens. They nearly all have what they call gardens, yet in some instances they are nothing more than a patch of weeds. Now, why is this the case? Because the labor of making and

tending is all left to the women, who are not able physically or have too much else to do; hence the garden is neglected. We do actually believe that some men think it degrading to work in the garden—like the big Indian, they think it squaw's work. We think where this is the case, or where the men are too busy to hoe in the garden, the best plan would be to hire a cheap boy to hoe the garden. There are plenty of boys that would be glad to get a job, and it would help the boys and save the health of the women. We have heard it said that it was beneficial to a woman's health to hoe in the garden, but we know from experience such is not the case—the work is too hard for women.

LIVE STOCK AND THE DAIRY.

BREEDING AND FEEDING OF CATTLE.

BY A. G. BUCKHART.

[Read before the Tipton County Farmers' Institute]

The subject, "Breeding and Feeding of Cattle," assigned me by the committee, is one upon which I have never attempted to either write or talk. Yet had I been consulted I could not have suggested one that I would prefer, or upon which more could be said, or that is fraught with more interest and importance to the farmers of our county, owing to the peculiar adaptation of our soil to certain crops, our seasons, climate and location with regard to markets.

Cattle is a term applied to the various races of domesticated animals belonging to the genus *bos*, a Latin root from which is derived the term "bovine," meaning when translated "ox" or "cow." They have been divided into two primary groups, the hump-backed cattle of India and Africa (specimens of which have been seen on our streets with various shows), and the straight-backed cattle so common everywhere. By many naturalists these groups have been regarded as mere races of the same species, and it is claimed that the offspring produced from the crossing of these two species is fertile, but the difference in the bone, formation, voice and habits are such as to leave little doubt of their specific distinctness. Oxen appear to have been among the earliest of domestic animals, as they were undoubtedly among the most important agents in the growth of early civilization. They are mentioned in the oldest writ-

ten records of Hebrew and Hindoo people, and are figured on Egyptian monuments raised 2,000 years before Christ, while the remains of domesticated specimens have been found in the Swiss lake dwellings along with the stone implements and other records. In infant communities an individual's wealth was valued according to the number and size of his herds. Abraham, it is said, was rich in cattle. The term is mentioned no less than sixty-five times in the Bible.

When Joseph introduced his father and brethren to Pharoah, the highest compliment he could bestow upon them was that they were "men of cattle," and when the King wished to honor them he told Joseph the whole country was at his disposal and to give them the best, and if any prominent among them, to make them rulers of his cattle. Oxen for a long period formed, as they still do among Central African tribes, the favorite medium of exchange between nations. After the introduction of a metal coinage into ancient Greece, the former method of exchange was commemorated by stamping the image of an ox on the new money, while the same custom has left its mark on the languages of Europe, as is seen in the Latin word "pecunia," and the English word "pecuniary," derived from "pecus," cattle.

The value attached to cattle in ancient times is further shown by the ox figuring among the signs of the zodiac; in its worship by the ancient Egyptians under the title Apis; in the veneration which has always been paid to it by the Hindoo, according to whose sacred legends it was the first animal created by the three divinities who were directed by the Supreme Deity to furnish the earth with animated beings; and in the important part it was made to play in Greek and Roman mythology. The Hindoos were not allowed to shed the blood of an ox, and the Egyptian could only do so in sacrificing to their gods. Both Hindoos and Jews were forbidden in their sacred writings to muzzle it when treading out the corn, and to destroy it wantonly was considered a public crime among the Romans, punishable with exile.

The domestic cattle of Europe, of which there are at least fifteen and a considerably larger number of continental breeds, have been, according to Professors Nilsson and Rutimeyer, who have specially studied this subject, derived from at least three distinct species, or races. Without going into a detailed description of the origin or nativity of these different species, together with the multiplicity of divisions, breeds and sub-breeds, which are almost as various as the soil of the different districts, or the fancies of the breeder, we will proceed to notice those breeds which we deem to be of greater importance to the practical farmer; and as our subject deals only with rearing and feeding, we leave out all the smaller breeds, likewise those that are inclined to be coarse and rough. The Shorthorns claim our first attention. It appears that from an early date the valley of the Tees possessed a breed of cattle which, in appearance and general qualities, were very much like the Shorthorns of to-day.

These Durham, Teeswater or Shorthorn cattle, as they were synonymously called, were soon eagerly sought after, and rapidly spread over the whole country. For a time their merits were disputed by the eager advocates of other and older breeds, some of which they have utterly supplanted, while others have each their zealous admirers who still maintain the superiority of the younger race. But this controversy is meanwhile gradually being settled in favor of the Shorthorns, which constantly encroach upon their rivals even in their headquarters, and seldom lose ground which they once gain. It is said that an enterprising Canadian, Mr. Cochran, of Hillhurst, has had a powerful effect in determining these extraordinary market rates for Shorthorns of choicest type. One cargo, including forty Shorthorn males and females, and choice specimens of Cotswold sheep and Berkshire pigs, brought out by this gentleman in 1870, is said to have cost him \$75,000. American breeders of Shorthorn cattle have now established a herd book of their own, and have been so successful in their efforts that already they have made numerous sales to English breeders at long prices.

The Herefords or white-faced cattle is the breed which in England contests most closely with the Shorthorns for first place. They are admirable grazing cattle, and when of mature age and fully fattened, present exceedingly level, compact and massive carcasses of excellent beef. But the cows are poor milkers, and the steers require to be at least two years old before being put up to fatten—defects which in our view are fatal to the claims which are put forward on their behalf. To the feeder who purchases them, when their growth is somewhat mature, they usually yield a good profit, and will generally excel Shorthorns of the same age. But the distinguishing characteristic of the latter is that when properly treated they get sufficiently fat and attain to remunerative weights at or even before two years old. If they are kept lean until they have reached that age, their peculiar excellence is lost. From the largeness of their frame they cost more money, consume more food, and yet do not fatten more rapidly than bullocks of slower growing and more compactly formed breeds. It is thus that the feeder frequently gives his verdict in favor of Hereford as compared with Shorthorns.

Polled cattle are simply an artificial race and may be produced in any breed by care and painstaking, by selecting only those for breeders such as have the smallest horns. As, for example, the polled cattle of Galloway had small horns as late as the middle of the last century, but by only breeding those with the shortest horns the grandfather of the present Earl of Selkirk succeeded in entirely removing them, and the same experiment has been made with equally satisfactory results on other breeds, as, for instance, the Polled Durham. For the above history we are largely indebted to the revised Encyclopedia Britannica.

Personally I do not claim to be a breeder, nor yet a feeder, except on a very small scale. Yet I have had some experience, and my observations

have been somewhat extended along this line. What I may say shall be along practical lines rather than scientific or theoretical. My object shall be only to stimulate and encourage better breeding and more extensive feeding in my own county. I have viewed with no little concern the careless indifference of our farmers in general, and my immediate neighbors in particular, in regard to the breeding and feeding of cattle. You will scarcely find a man nowadays who would select a pig or lamb from his own herd to use for breeding purposes, and as a result we see a number of men engaged in the breeding of the different strains up to the highest possible type, and all receive such liberal patronage that they are fully sustained, and our county will compare favorably with any in the State in the production (numbers considered) of hogs and sheep. But when we turn to our subject the situation is quite different. I could cite you many who have gone to great pains and expense in fitting up a herd of Shorthorns who have long since abandoned their chosen field of usefulness for the want of patronage and support which they so richly merited, and as a result we have to-day in our county a class of cattle, taken as a whole, that are neither fit for breeders nor feeders. As a shipper of live stock, I have many times obtained the extreme top of the market for hogs or sheep, but seldom—indeed, I only recall three times when I have done so with cattle, and these were taken each time from my own feed lot, having selected my feeders with the greatest of care, and then fed them to a finish.

In breeding cattle for feeding or beef-producing, it is not necessary to have them thoroughbred or full-blooded; but it is absolutely necessary that the sire be a thoroughbred. Nor am I so particular as to one special breed. Hon. John W. Springer, President of the National Live Stock Association, in his annual address before that organization recently at Denver, says at this point we have now about us the Shorthorns, the Herefords and the Polled Angus, the best of the world, or, in other words, the world's best. I would at this day and age, by all means, favor some kind of polled breeds, since muley cattle are becoming so popular, if, indeed, not actually necessary, owing to our need of housing in winter, and much time and cost can be saved by turning them in together rather than tying or stalling separately. "But," says one, "we can dehorn them." To this I would say an ounce of preventive is worth a pound of cure. Do you say that the cost is trivial? True the 10 cents you pay for the operation is a small matter, but I am convinced by experience and observation that it costs at least fifty pounds of flesh. This, at 4 cents per pound, amounts to \$2. Hence I have come to the conclusion that no man can afford to dehorn a steer. Another says: "I use a fluid on my young calves and destroy the horns." To this I answer, the practice is even more cruel than the other. Do not tell me that it don't hurt. It all depends on which end of the brush you have hold of. I have known a number of calves ruined, some killed, others, and not a few, with one horn; still others with stub

horns. The idea of rearing cattle with horns and then taking them off, by any process, is too much like allowing a boy to acquire the habit of drink and then giving him the Keeley cure. If horns no longer have a place, which all concede, then let us do away with them in the surest way, the easiest way, the humane way, the safest way, in nature's way—by breeding muleys. There is no earthly reason why we can not grow just as large, compact and handsome cattle of any breed or color without horns as with them; indeed, the advantages are with the muleys, as they are less inclined to boss, and the timid ones stand equal chance; hence in muley herds you see as a rule uniformity of size and flesh. But if you must have horned cattle, simply because your father had them, then get a Short-horn, and the shorter the horn the better. It is the poorest kind of poor economy to purchase a grade calf simply because he is cheap. If you do not feel like investing \$75 or \$100 yourself, get one or two of your neighbors to join you, and buy not only a thoroughbred, but insist on a good individual, for all thoroughbreds are not good ones. I have seen Jerseys that I did not doubt were thoroughbreds.

But I must leave this part of my subject and turn to that of feeding. I have often remarked that if our farmers would save all of their fodder and feed it to cattle instead of poling down the stalks and burning them, the net profits would more than pay their taxes. I have seen men who would carry out corn to their hogs two or three times per day, while their steers were allowed only a strawstack or stalk field, and should they even attempt to pick up an ear out of the mud where the pigs were feeding, a boy would be stationed there with a club and perhaps a dog to drive them away. I would urge upon our farmers the importance of feeding more cattle and feeding them better. The time was when, with cheap land and unlimited range of public or unfenced domains, our fathers could succeed reasonably well by grazing alone. If their profits were small, their expenses were practically nothing. But that time is past so far as our county is concerned, and we are all glad of it. Now, when every acre is worth from \$40 to \$60, with a rental value of from \$4 to \$6 per annum, we can no longer allow the old rate of three acres to the steer for the season, and then sell him for \$35 in the fall, but apply the new methods of farming and produce 180 bushels of corn on these three acres, and then, by saving fodder and all, we can feed three steers all winter and sell them for \$70 each. Besides, you can have, after these three steers, at least three shoats, which, allowing one pound per day increase, will produce 500 pounds of pork or \$20 additional. And the Ohio, Pennsylvania and New York farmers say that the manure will compensate for the cost of labor in feeding. In order to get the matter before you in a tangible form, let us take the farmer who has grown ten acres of a surplus of corn which he expects to market after he has fed his crop of pigs, provided sufficient to carry him over winter and feed his team next season. We will now suppose that he hauls this corn to market and receives 30 cents per bushel, or \$180. Now

let him purchase ten steers of, say 1,000 pounds' weight, at 4 cents, a fair average price for feeders; feed them this same corn six months, when they should weigh 1,400 pounds; and as there is usually from 50 cents to \$1 per hundred weight advance on the price of fat cattle in the spring over that of feeders in the fall, we will take the average and estimate them at \$4.75, and we have \$675. We may count on ten shoats making a gain of one pound per day each, which will be 1,800 pounds; at 3½ cents per pound, this equals \$63. Add this to the \$675 and we have \$738. Deduct the \$400 cost and \$180 which the corn would have brought, and we have \$158 remaining to the credit of the ten steers. The average eighty-acre farm can take care of ten cattle without extra help. Thus we see by a little work he is able to market his corn at 56 cents instead of 30 cents, or he is able to hire a man at \$1 per day, and these ten steers will pay the whole bill and leave all the fertility on the farm instead of impoverishing it. If he is inclined to be greedy and wants to make money faster, he can purchase twenty cattle and an additional 600 bushels of corn, and at this same ratio double his profits or swell his winter's income to \$316. Does any one think I have been extravagant? Let him ask those of his neighbors who have been engaged in feeding cattle. You have them all around you. If their statements are doubted and you want additional proof, look at those who have kept up the practice of feeding in carload lots for a period of ten years, and see if they are not among your most thrifty. Or perhaps we may get a clearer conception of the matter by comparison with other live stock. Take, for instance, a good colt at weaning time, and he will cost, if you buy him, from \$25 to \$40; if you keep the dam and raise him he is likely to cost you more. Now care for him until he is five years old, and you may succeed in selling him for \$100 if he has not lost an eye or sprained a limb or slipped a joint or some one of the other mishaps to which he is liable. Subtracting cost from this, leaves \$60, or \$12 per year, for his keep and your pains to break and season him to work. Now take a calf at weaning time at \$15; keep him until he is two years old, and, with ordinary treatment, he brings you \$50. Subtract cost, and you have \$35, or \$17.50 per year, for keep. Compare him with sheep. In these you have your neighbors' dogs to contend with; they are also subject to parasites without and within, foot-rot, scab, grub, stretches, and I can't tell you what else. You must keep him away from strawstacks and all kinds of burs or you will spoil his fleece. In hogs you have the cholera, swine plague and other forms of disease, which perhaps kill 25 per cent. of all hogs in our State. In summer he suffers from heat, in winter from cold. He is continually poking his nose into the business of others, and if there is any chance he will stick his foot in also. Thus he is a constant drain on your patience and requires eternal vigilance. Our steer is not proof against accident or diseases, but he certainly is the nearest free from them and requires less attention than any domestic animal with which we have experimented. A great deal is being said of late about factories

of various kinds, and large donations are asked and usually given to secure them; and then the operator usually pockets all of the profits, and the community is content with the fact that somebody has been employed to labor and others have found a market for raw material. We have introduced to you a factory that will employ labor on every man's farm and furnish a market at home for corn, hay and stubble (straw) at remunerative prices, and then turns over all profits to the community in which it operates. This factory can use in its employ men, women or children, to suit your own convenience. It runs all the time, day and night, spring and summer, fall and winter, and at full capacity if you only furnish plenty of raw material. It is always steamed up to normal heat and its whistle is never heard except when short of supplies. The products of this factory are sought after at home and abroad. Kings, queens and epicurians of foreign lands are calling upon us for its porterhouse and sirloin cuts, while our people depend upon it largely to sustain life itself; indeed, upon one of the products of this factory we rest our very soles. Truly this is a source of profit, a thing of beauty and the joy and pride of the farmer.

CATTLE BREEDING.

BY J. H. MILLER, MEXICO.

[Read before the Miami County Farmers' Institute.]

In compliance with a personal request made by our State Superintendent, Prof. Latta, that I have a paper on cattle breeding for this occasion, I am before you.

On the farm, in the feeding fields and cattle barns I feel somewhat at home. On the platform, before an audience, I am a stranger. Our plan of work all appears simple when we are at it, but to set it out in words seems very difficult, and no attempt will be made to give details; only in a general way will I try to give some counsel to beginners on the topic.

Cattle for Profit.—You want to begin the cattle business? The first question to settle will be, what breed to take up? Location and surroundings will have much to do in deciding—nearness to market, the kind of feeding stuffs most readily and cheaply obtained.

If you find yourself settled near a great city, it is likely that some form of dairying will promise best, and you will begin the study of Holsteins, Jerseys, Gurnseys, Ayrshires and Brown Swiss—about the full list of special dairy breeds, and these vary in their points of excellence. Some have renown for quantity, and others for quality of their milk. Some will win at the churn, others at the cheese press. While still another kind will

bring in the most nickels if their product finds a market through the cans of a milk wagon.

But in dairying I have had no experience and shall not undertake to advise you which of the above breeds to take up, or of their management for profit, but am here to try to describe and picture to you what observation and experience has proven to me, that type and breed, or breeds for profit to the general farmer.

THE GENERAL PURPOSE COW.

The live stock industry of America, and particularly of the United States, has lately experienced a revival; with that revival it is discovered that the business is entering upon a new era. Old methods are giving way to modern ideas and systems. The territory once devoted to the range has yielded to the man with the hoe, and the stock from the Western ranges now stop in the corn fields before going to market.

All this is comparatively new and has brought growers face to face with new conditions. This being so, it is of the utmost importance that farmers and cattle growers of the Middle States should come together on occasions like this and discuss these questions for our mutual benefit.

Now, if you intend making your home in the Far West, where rough foods are plentiful and cheap, where the concentrated and richer foods are scarce and dear, where pastures are wide and free, there the promise of gain will be in the production of feeding steers for finishing nearer market where the grains that fatten are grown. For this enterprise I hardly think it will pay to buy high-priced pedigreed stock. Well-bred high grades of any of the beef breeds for the females, selecting those nearest the type sought to be produced, but in no event should you be tempted to use anything but a pure-bred bull. For the head of the herd, select from one of the several beef breeds, as your judgment on fullest information shall decide. This list comprises Polled Durhams, Shorthorns, Aberdeen Angus, Galloways, Herefords, Red Polls and Devons. Of course, this order would be changed by the breeders of the several kinds, and each breeder could give good reasons for placing his favorite at the head of the list. In the Middle and Eastern States many farmers find profit in buying store or feeding steers, at weights varying from 700 to 1,000 pounds, and finishing them out to market at 1,400 to 1,600 pounds.

This line fits admirably with grain and grass farming, as we have it through the Wabash Valley country; though well-nigh abandoned during the recent depression in prices, seems now to be happily reviving again. This line enables the general farmer to combine his roughage, as hay, straw and corn fodder, with grains and mill feed. A farmer by this method may convert all his grass and grain into the higher-priced product of beef, and to this end he may bring on to the farm bran and other mill feed, with barley grains, the gluten meal and oil cake. Some of these are very rich in the higher-priced elements found in commercial fertilizers

and far ahead of commercial fertilizers, and cheaper, too, will be found the manure heap in maintaining the fertility of the soil. With us, corn must be the main reliance in fattening steers, and, under ordinary circumstances, the best way to feed it is in the fodder, having hogs to follow the cattle.

Time will not allow me to go further on the subject of fitting for market.

The work we are doing on the farm, and that with which I am most familiar, is breeding pedigreed "cattle for profit." When it came into my mind to take up this line of farm work, on looking over the list of beef breeds, without prejudice in favor of either kind, I was attracted to the Polled Durhams, as the coming cattle.

Remember that one branch of Polled Durhams is nearly pure-bred Shorthorns, and the other branch is Shorthorns, pure and simple, without the horns. Now much can be said in favor of either of the other beef breeds. But recollect that Shorthorns, Polled Angus, Norfolk and Suffolk Polls (now called Red Polls), the Herefords and Devons, were distinct breeds a hundred years ago. With their admirers and advocates, yet, in all these years, the Shorthorns have led them all, and to this day there are more Shorthorns fitted for market than all the others combined. From this statement of facts, as well as from actual experience in feeding for beef, I became an admirer and believer in Shorthorns, but at the same time being thoroughly convinced of the utter worthlessness of horns on all domestic animals, you can readily see how it came about that I took up the rising young breed, the Polled Durhams or the Polled Shorthorns. In the spring of 1891 I visited the originators of the now popular young breed and purchased their herds of Polled Durhams entire. A little later I secured by purchase the well-known bull, "Young Hamilton," No. 49, American Polled Durham Herd Book, No. 114169, American Shorthorn Herd Book, with clean and naturally polled head, a pure-bred Shorthorn, of registered Shorthorn parentage (and animals of much individual worth), a freak of nature or an atavism which can be traced to a remote polled ancestor. This bull, now in his eighth year, has proven a very impressive and prepotent sire, and by his use and a number of the best and most richly bred Shorthorn cows I could procure I have succeeded in laying as foundation for my future breeding operations a herd of some numbers of pure-bred Shorthorns polled of the highest order, both in breeding and individual worth, representing such of the American-bred families as Rose of Sharon, Young Mary, Young Phyllis and Desdemonas of the Scotch or Cruickshank families, Victorias, Lavenders, Golden Drops, Barmtons and Secrets.

I have said that horns are useless on our cattle, their only use being to continually annoy, master and mutilate each other, and that which is of still far greater significance, the endangering of life to the human family. And since the breeding world at large has so nearly unanimously

conceded their utter uselessness, I feel that on this point it is unnecessary to take much of your time, but I must go a step further and state it a little stronger. They are not only worthless, but they are the direct source of much harm and great loss; there is direct and positive gain in taking off the horns. We have the proof of this—that practical men have sawed the horns from hundreds of thousands of feeding steers. The breeders of Shorthorns and Herefords, though professing to see great beauty in horns on herds, yet silently pay the highest possible compliment to the work we are doing by having all their feeding bullocks dehorned through the bloody, painful and cruel work of saws and clippers. The limits of an institute paper, if all taken with arguments in favor of hornlessness, would be too small for a full statement, having in mind the pain of de-horning; and, in view of the wide call for hornless heads in every feeding lot, is it not the part of a humane wisdom to supply the demand through the art of breeding? Polled Durhams have, in common with their ancestors, the Shorthorns, the double quality of milk and beef production. It is a fact that Shorthorns have won more prizes at the English dairy shows than all the so-called special dairy breeds. Now, then, we think, in Polled Durhams, we have an ideal beef and milk animal combined in one, and just the animal to suit the general farmer as well as the beef raiser.

Of course, all farmers and breeders can not be an Amos Cruickshank, a Booth, Colling or a Bates, or even a Colonel Harris; but I want to urge upon you the importance, for pleasure and profit, of breeding for good ones. The quickest, easiest and surest way to breed good ones is to buy good ones as foundation. The idea is very prevalent (though a mistaken one) that all registered animals are alike, and must be good from the fact of their registration. An animal may be registered and have a pedigree as long as your arm and yet only a registered scrub, without individual merit or value whatever in lines of breeding, and should not be allowed to reproduce itself. The posted and successful breeder does not care so much about the length of pedigrees, but what kind of animals, individually, are represented in these crosses. Were they animals of true worth? For my part, I would rather own a cow with but four to six top crosses of sires known to have been individually and constitutionally good, strong and impressive breeders, than pedigree of such great length of common, plain and unknown animals, even though registered for many generations. Every man entering the field of breeders, after once having decided on the breed he shall handle, should buy the very best to be found, or that his circumstances and surroundings will permit. There is no truer law in nature than that "like begets like," hence the importance of starting right and you can no more expect to buy a good and well-bred cow for twenty-five to fifty dollars than you can enter the stores of your city and purchase a dress pattern of the best piece of silk manufactured at fifteen or twenty cents per yard. High prices for breeding stock is not all the idle fancy of the rich man to own some coveted animal. "Bulls are oc-

casionaly produced worth thousands of dollars just as surely as a well-fatted steer may bring a nickel a pound in our stock yards."

In breeding pedigreed cattle for profit, nothing short of the very best care you can bestow should be thought of. In the first place, well-fed and highly developed animals are always attractive; men who come to breeding barns expect to see something above the ordinary. It will not satisfy the average buyer to be told "all these cattle need to make them as fine and large as those of Mr. So and So's is more feed and the same care he gives his stock." Ill-kept and under-sized cattle can only be sold to second and third-rate buyers; they will not command the prices that bring gain to the breeder. The fat, sleek cows are the silent salesmen of the breeding barns, more effective than any speech the owner can make to bring prospective buyers to the point of purchase. We hold, too, that quality can be fed into cattle, as well as bred into them. We believe that stock that has been pushed to early maturity through several successive generations by generous care will beget the quality of early maturity in their offspring, finally fixing it as a valuable heredity in the family so treated. On our farm we certainly do not allow our cattle to go hungry. We grind all our grain, mix bran, oats and other foods with the corn to give needed variety, and to the mixture we add a considerable quantity of cut hay or straw to give bulk. It is believed that ground grain alone clogs in the stomachs of cattle and does not undergo the remastication known as "chewing the cud," and which is necessary with all stock of the split-hoof kind to get the best results from all they eat. Pure water, plenty of it, ventilation and clean quarters must all be provided, or no profits will follow.

I want to say a word more in favor of the general-purpose cow for the general farmer. No farmer can afford to own and keep a cow that will not give a sufficient amount of milk to raise a calf and raise it well, or that in case of accident or failure to longer breed, and when her life's work is done, will not bring from fifty to one hundred dollars on the butcher's block. In the past six years I have sold a number of dry cows for beef, but never yet have sold one for less than one hundred dollars. A few years ago I sold one on the market at Buffalo that brought \$136.50 for beef. She weighed at home 2,150 pounds, sold for 6½ cents per pound gross, dressed a fraction over 70 per cent. of her gross weight, and was pronounced the finest beef ever put on that market. Only a few days ago I sold a heifer just twelve months old (that I thought not to keep as a breeder) to a Peru butcher for \$40.37, in our barn—all the result of good blood and good keep. Remember that something does not come from nothing. God's pure air is bracing, but that alone will neither make milk nor beef. The cow is but a machine to convert grass and grain and other foods into milk or beef; the greater the capacity of the machine, the greater the finished product—that is, the more a calf can be induced to eat and assimilate, the more he must gain in weight and beef, and any

manufacturer will tell you that he finds more profit in running his machinery at its fullest capacity than on half time, or if one machine can be made to do the work of three or four, there is certainly economy in operating the one to its greatest capacity; so don't be afraid to feed liberally. The twenty-cent corn now marketed by many farmers, if judiciously fed to good, thrifty calves, twice or three times that amount could be realized. The average weight of calves at birth is supposed to be near 100 pounds, and if of good breeding and well kept, it is easy to have that same calf weigh 1,000 to 1,200 pounds at twelve months old, and in no one year thereafter can a like weight be put on, even though the amount of feed be many times greater. Hence, I say, push the calves. You can not afford to withhold the feed from them. I know we use to think that we must keep a steer to three or four years old and allow him to lose in winter what he had gained in summer. But we have found a better way now, and the demands and conditions have changed. It is baby beef we now want, and it is in the highly fed young animals we find the greatest profit.

I want to go back again to breeding. The field for pedigreed breeding is as wide as the world, and the demand for good animals will never cease. It may sometimes run low, as it has, in common with other lines of business, in recent years, but even then the best breeders have found sales at paying prices; but to make it pay well, you must not go at it in any half-hearted way; you must be willing to buy the very best stock to be found in the strain you adopt, and follow that up with the very best care your knowledge and judgment can invent. Before investing much money be sure that you have a liking for the business, and a love for the stock. I don't know how it is, but it seems to be true that the corn that comes to a cow, pig, or a horse, from the hand that loves it, will go further toward laying on fat than an equal or even greater amount from the man who cares nothing for the animals he feeds. I had rather trust the management of a large breeding establishment to some professional man, or to a banker, merchant or manufacturer, who has an inborn love for domestic animals; who can give no personal care or be able to visit his barns more than once or twice a week, than to put it in the hands of any so-called practical farmer, no matter how industrious, who, withal, lacks interest in his business and has no love for the stock he has in charge. One of the most successful breeders of Shorthorns within my acquaintance is the Hon. H. F. Brown, a banker, of Minneapolis. He not only breeds fine cattle, but keeps his herd on a paying basis. He breeds cattle because he loves them. Every hour that can be spared from an active business life in the city is given to his pets, as he calls them, and an afternoon in his cattle barns is an unfailing source of pleasure to him, and gives him higher feelings of enjoyment than any attraction the city can offer. Such interest brightens the eye to detect anything going wrong and is fruitful in suggestions for bettering the conditions of his cattle, and

fills the heart with an active sympathy for the comfort of those living beings—dumb brutes, though they be—he feels them to be, in fact, his fellow-creatures.

In conclusion I want to repeat that the field for breeding pedigreed cattle to sell, as breeders in turn, is as wide as the pasture of the world. As a rule, there is no jealousy among the breeders, as indeed there should be none. Emulation there is, but no envy if my neighbor can and does produce a better cow or bull than mine—it only adds to the general renown of the breed and proves the mutual advantage of all concerned. The greater number of good breeders, and the more extensive breeders near to each other, the better for all. The Blue Grass region of Kentucky, so widely known for the fine horses it grows, attracts buyers from all parts of our country, and from other countries, and this has come about through the fact that within a radius of fifty miles from Lexington there are more men engaged in raising horses than in any equal area in all the world. We have found that we can raise Polled Durhams at a profit. The gain would be doubled if within one hundred miles from Peru we had one hundred farmers devoted to their production. Yes, we would like to see Miami County become the center of a great cattle-growing district, with all breeds well represented and Polled Durhams leading all in quantity, as I believe they may in quality.

POULTRY ON THE FARM.

BY MRS. J. R. PARR.

[Read before the Benton County Farmers' Institute.]

It is the common opinion among farmers that poultry is of so little importance that man is belittling himself in paying any attention to such, so that practically the only notice he takes of it is to growl if one gets in his way or in his feed bins, and is even ashamed to be seen carrying eggs to market. He likes the returns when applied on his store account, but would much rather his wife took them to market. He "does not like to be bothered;" "It looks small for a man."

Now let us see if the poultry industry is so small that one need be ashamed to go to the expense of providing comfortable quarters for fowls and caring for them intelligently:

In the year 1897 there were 375,000,000 chickens in the United States; these produced 14,400 millions of eggs, which at the export price at New York of 15 cents a dozen amounted to the vast sum of \$165,000,000. Now for comparison, and by comparison only can we grasp the true value of the poultry industry. Our oats crop last year was worth \$163,000,000; \$2,000,000 less than our eggs alone. To the eggs we must add the poultry

sold for meat, which amounted to \$125,000,000; the eggs and meat product together amounting to \$290,000,000. Our wheat crop was worth \$237,000,000, or \$53,000,000 less than our combined poultry product. We are not ashamed to raise wheat and oats. Our hogs were worth less than our poultry, and our potato crop not one-half the value of our egg crop alone. One year's earnings of poultry will buy all the mineral produced in a single year, and will in addition pay every cent of the interest on farm mortgages.

Contained in the eggs of last year's production it is estimated there was 550,000 tons of water, 50,000,000 pounds of sugar; and to make the shells for these eggs it took 110,000 tons of lime. These figures give you some idea of the magnitude and importance of the poultry industry. Now, can you not devote some time to a poultry department on the farm? If you men have not the time, encourage your wives and daughters to take charge of this department.

Build them a good chicken house the first thing; it is of greatest importance; and right here I'll say, don't think, because it is a chicken house, anything will do, nor any plan you may think up yourself, without first knowing why a chicken house should be built a certain way, and no other, for best results. After you have given them a good house, then if you have not the means to spare to buy an entire stock of good, all-round, thoroughbred chickens suitable for the farm, give them enough to get a pair or trio, or a setting of eggs. Large egg production being desirable on the farm, time would be saved by paying a little extra and getting good stock from some noted heavy-laying strain. To find out where to secure such, let your wife subscribe for a good poultry journal. You get the benefit of years of experience by hundreds of poultry raisers for a very small sum.

The care of poultry is a very interesting study. It is a science to know how to get up a properly balanced ration; to know what foods will give you the proper proportion of protein, ash, etc. To know how to feed for eggs; to feed for quick growth, or what to feed to fatten. Some of you will say: "Oh, there is nothing in all that; we raise chickens and feed nothing but corn," which is true, but are your fowls as profitable as they might be?

I'll venture to guess there is not a flock of mongrel hens in Benton County that lays an average of 100 eggs to the hen a year, yet it is possible, with the right stock to begin with, and with proper feed and care, to make your flock average 200 eggs each. If any of you have ever given the feed subject study, you will agree with me that with the range of the farm a flock of hens can be kept for 50 cents each per year; and that if you carefully gather your eggs each day, so that every egg can be relied upon as absolutely fresh, and your flock averages 200 each per year, and you sold them for an average of 1 cent each, you would have a net profit to the hen of \$1.50. What does this mean? That the same care given a

flock of 1,000 hens would give you a larger annual profit than your average 160-acre farm. Now, some one will say: "If that is so, there would be more people engaged in the business." The reason there are not more people engaged in it is, as I said in the beginning, farmers generally do not appreciate the value of the poultry industry. Again, others start expecting to make this profit from the beginning, not realizing that to successfully handle so large a number of hens one needs years of experience and study.

It is a business in which there are a larger per cent. of failures possibly than in any other line. It takes lots of stick-to-it-iveness, patience and hard work; but that makes it all the more interesting to the lover of poultry.

If every one could be successful, the markets would soon become glutted, and no one could make it pay. The persons here and there who work to such proportions as to be felt on the market are far apart. One plant in Ohio has a standing contract to deliver daily to the station 200 or more one and one-half pound broilers; that means 313 work days in a year; 200 chicks a day, or 62,600 chicks he must grow in a year; and still the market does not feel it, as he is only one man in over 70,000,000 of people. There is a profit for you, however, whatever number of chicks or eggs you may produce, and the possibilities are without bounds.

Take pride in the stock you produce. One breed is enough for the farm, and when all the hens in a flock look alike, the flock is much more attractive than it would be made up of mixed colors. It costs no more to feed a thoroughbred than a mongrel. There is always a demand for good breeders at considerably better prices than the city markets offer.

Take pride in the egg record of your flock. A hen having an egg record of 100 eggs a year, mated with a male bred from a heavy-laying strain, will raise the egg record of their progeny. A continuation of this line of breeding will raise your egg record to 200. There are flocks now above 225 eggs each, the result of years of attention.

For a part of last year we kept a careful record of three pens, one thoroughbred, one mongrel, the other claimed to be the pure-bred, but raised without attention to egg production. The thoroughbreds laid in that time 75 eggs, while the others laid 45 and 46, respectively. These were kept in the same house and given the same care and feed. The loss in feed on these two lower-record pens is an item to be considered.

Take pride in the freshness of the eggs you take to market. Test every egg. It is the poor quality of eggs that makes the price low. Don't do like the farmer who found several nests in his weed patch when he mowed it, and gathered the eggs into his basket and took them to town without knowing whether they were good or not, and then grumbled because eggs were so low. And don't market a dirty egg. Have them clean and attractive and, if possible, of one color.

Produce what your market demands. If dark-colored eggs are wanted, don't keep hens that lay white eggs. If yellow-legged, yellow-skinned are wanted, don't raise white or blue.

Treat your fowls gently; make pets of them. What a pleasure it is to have them flock about you and eat from your hand. A flock so treated will give better results than one that runs whenever you appear.

Clean your henhouse daily. Feed and water regularly. Keep your hens busy scratching. A lazy hen is an unprofitable one.

It is a mistake to keep old and young stock together. The old hens will become too fat on the same amount of feed it takes to keep the pullets in good condition.

As a "side issue" on the farm there is no investment of so small capital as is required for hens that will give as good returns. A hen is worthy the best work of the fancier, the farmer, or the business man. Select the breed you like best; study their peculiarities and needs; treat them kindly, feed intelligently and you will be sure to succeed, and with success comes profit.

DAIRYING.

BY E. A. WHITE, QUAKER HILL.

[Read before the Vermillion County Farmers' Institute.]

Mr. President, Farmers, Neighbors and Friends—We are told that there are but three learned professions—that of the physician, who feels our pulse and doses us with pills; the theologian, who vainly tries to lead us up out of this quagmire of sin, and the lawyer, who settles the earthly disputes of the other two.

But it seems to me that these educated people would have rather a sorry time of it were it not for us horny-fisted hayseeds, as the world knows us; and the day is coming when farming is going to be a science, and if farming becomes a science, then the subject of our paper goes a step further and can claim place among the arts.

We can not do better than quote F. D. Coburn, of the Kansas Agricultural Society, who says: "It is not for a moment to lead any one to the belief that dairying in any line presents an easy or short road to wealth, however high the price may prevail at a given time. On the other hand, it is insisted that most of the work connected with dairying is hard and disagreeable; that it must be performed every day, Sunday as well as week days, and can never be put off till to-morrow."

It requires the strength of a man with the patience of a woman, along with skill, cleanliness and brains.

Every man has his hobby, but, fortunately, no great wave of delirium has ever struck old Vermillion. The field is so broad, and, if the full meaning of the word be accepted, then we have the ideal farmer, because it includes the scientist, the chemist, the physician and the thorough-going man of affairs.

Dairying is making rapid strides in the way of development, and, with a Secretary of Agriculture who will do something, the markets of the world are being opened to us.

England used to buy the greater portion of our butter and cheese, but our laws were lax; we sent them filled cheese and butter of an inferior quality. To-day Denmark, Holland and Australia have our foreign trade—a costly lesson, but it only goes to prove that "honesty is the best policy" every time; and right here is the keynote to the success of Wisconsin, Minnesota and Iowa as dairy States. Their population is largely made up of Germans and Danes; they were reared in the dairy at home, and when the movement was inaugurated on an extensive scale, these same people made a blooming success of it because they knew what it required to become a successful dairyman.

We can not say too much in commendation of our stations in experimenting and conducting dairy courses in connection with their short-term work every winter. Their bulletins are valuable and can be secured for the asking. When such men as ex-Governor Hoard, John Gould, George E. Scott, or even our own Professor Plumb, who have spent years in hard, practical experience, and added to that the ideas and pointers they have gained by travel and on the platform, tell us there is money in rightly managed dairying, we should do some rather close observing before we gainsay the assertion.

It is not our purpose to say what breed of dairy cattle to select from, because authorities differ; but one thing is very certain—don't try to assemble the beef type and the dairy form on the same carcass—it can't be done successfully.

The great systems of transportation now make competition so fierce both among themselves and the producers as well, that it matters not whether we make butter and sell it at home or have a milk route in a distant city, as H. B. Gurler, who sells 800 quarts of milk and cream in Chicago, and produces it at his farm sixty-five miles west.

Again, science is helping us, and if we should visit the operating wards of a large hospital we should find purity and cleanliness the underlying principles. All instruments are thoroughly sterilized by boiling in water, which kills all germs of infection, and everything in connection with a case kept scrupulously clean. These same principles have been applied by the dairyman, who thoroughly aerates his milk, to the creameryman, who Pasteurizes the cream, thereby producing an article chemically pure, at the same time enhancing its value and improving its keeping qualities.

Only last summer a can of Pasteurized cream was shipped from a small town in Wisconsin to London and return—on the road twenty-two

days. When opened it was found to be in good shape, showing what can be accomplished with this very susceptible product if rightly handled.

The days of drudgery for the dairyman are going by, for, with the many farm powers are coming the milking machine and the separator, which are increasing our profits, at the same time lessening our work.

The farmer, as a rule, says that dairying is a close, every-day business. Just so. But the trouble is he makes his living too easy, and then tells us about these hard times all in the same breath.

As is usually managed through our immediate section, the farmer keeps cows because—well, just because the womenfolk must have that much needed collateral at times, you know—and as a result his herd has abundant pasturage during the short spring months, while, when the drought comes, which is sure to come, and which does come with astonishing regularity, every cow in the herd shrinks in her milk flow and not a few go “dry;” while, soon to be followed by the cooler and close months of winter, the last one of them, even old “Faithful,” concludes to go out on a strike till warm weather, and she generally does it, too.

Now, such a performance causes our farmer friend to hang his empty milk pail on its peg and announce to the “gude wife” that “dairyin’ don’t pay, nohow.” “Well, she has come to that conclusion long ago, not to say anything of the crocks, pans, pails, churn and a thousand and one things pertaining to milk and its care.

After we have acquired the scientist’s methods of selecting, caring and sheltering, we shall have recourse to the chemist’s laboratory, in which to know what feedstuffs produce the best results and what their different properties may be; not only this, but it is interesting to know what kind of soil we have, and of what it is composed and what crops it will best produce. Only last week there appeared in the Scientific American an illustrated article showing how our Department of Agriculture is studying soils and plants adapted to them.

Brother farmers, get acquainted with your farm-animal anatomy, because the ability to act in an emergency is often the means of saving a valuable life.

Do our friends down street run their mercantile business by chance? Not at all, by any means. So let us take a kindly word of advice and keep an accurate account of feed, care, pasturage, first cost of cows, amount of milk they produce, the butter that is churned, the pigs and calves it will grow fat and smile at you every time they meet you, and, lastly, the manure that is made and its value in keeping up and improving the soil and its fertility.

But there is another side which must not be forgotten. It puts the farmer on a cash basis and makes of him, if he would succeed, a student, brings culture to his home and makes of him a better neighbor and a citizen worth knowing; and may the time come when Old Hoosier ranks with New York, Wisconsin, Iowa and Nebraska, and Vermillion becomes the “garden spot” of the Wabash Valley.

FEEDING CATTLE.

BY J. A. PARKER, TERRE HAUTE, IND.

[Read before Tippecanoe County Farmers' Institute.]

Mr. President—In accepting your invitation to meet with you this morning for a neighborly exchange of ideas and experience as to the best and most profitable method of feeding and preparing stock for market, I expect to be the gainer. I presume I shall hear from those who have had a much larger experience than I have had, although I may offer some crude ideas that you may catch and build upon.

As there is such a variety of conditions and circumstances connected with the preparing and finishing of stock for the market, what would be favorable under some conditions would prove a failure in others. Therefore, the first two factors I would introduce as a foundation would be a large per cent. of well-balanced common sense, accompanied with stability of habits. With these two factors in the foundation, you may add all the book knowledge you wish; the more the better. It is a good mixture. You will find it shortens the road from cause to effect.

Each individual animal has its characteristics. They have their likes and their dislikes; however, you may overcome many of them by understanding their peculiarities and treating them accordingly. All observing feeders well know that it requires close and careful watching to take a bunch of cattle up from their first day's feed to a full fattening ration without, as the saying is, getting any of them "off their feed," as one overfeed will destroy all the increase you have put on the animal for the past ten or fifteen days. Comparatively speaking, you have to commence again as with the first feed, which makes a great deal of trouble unless your animals are tired so they are feed separately.

Over feeding and irregularity in time of feeding are the principal causes of founders and scours, which are always followed by a loss of appetite. Therefore, I say common sense and regular habits are very important factors in preparing and finishing up stock for the market, and especially for the top market. I will further say that I do not think you can combine enough other good factors, leaving these two out, to make a success in feeding for our best markets.

Taking it for granted that all experienced feeders will agree with me this far, I will now give you an idea of my arrangements for stabling, feeding and watering my stock.

I tie my cattle with ropes or chains to stanchions about four feet apart, giving them plenty of head room. They stand on plank or concrete floors, with their heads to the wall or side of the building. My feed troughs are thirteen inches on the bottom, fifteen inches high and eighteen inches wide

at the top, and are continuous the full length of the barn, with head partitions between the animals. My water troughs the six inches by eight inches, running full length, and are just under the edge of the feed boxes or troughs. They are filled from my windmill tank with pipes and are kept full through the day, but emptied every night so as to have pure and fresh water each day. The stock can drink at any time, consequently they never take enough at one time to chill them.

I will now give you in detail the kinds of food and the amount of each kind to make a day's ration of three feeds for one animal, and the result of such feeding per day in gain of flesh; also the cost of a day's ration and the cost per pound of the increase of flesh. When the stock are brought up to full feed, the daily ration consists of ensilage, corn meal or hominy hearts, with bran, in the following quantities: The ration for a 1,200-pound steer is made up of 60 pounds ensilage, 9 pounds hominy hearts, or 10 pounds corn meal and 6 pounds bran, well mixed together. I use a spray of salt water on the mixture while mixing, just enough to make the meal and bran stick to the ensilage. This will give you 75 pounds of this mixture or three 25-pound feeds. Perhaps I should say here that my ensilage is made from our common dent corn when it has just passed out of a stiff dough and would husk out from 60 to 70 bushels of corn to the acre. When cured and ready to feed, you can press with your thumb and finger small globules of water from most any piece of the stalk, from below where the ear starts from the stalk. This will show you that it was not dried up in the field or overheated in the silo.

With this ration, a well proportioned steer of the leading beef breeds will take on from $2\frac{3}{4}$ to $3\frac{1}{2}$ pounds per day of flesh, and I have, in some instances, had them make a gain of 4 pounds, but it is not frequent. This ration would cost about $13\frac{1}{2}$ cents per day. On two lots of sixty head each of common stock, I got an average gain of 3 pounds per day to the steer, which would make the increase cost about $4\frac{1}{2}$ cents per pound. These steers cost me 3 cents per pound when I purchased them. To illustrate: A 1,000-pound steer cost me \$30. I put on 400 pounds of flesh at a cost of $4\frac{1}{2}$ cents per pound, which is \$18. He is now ready for the market; his total cost is \$48 and he weighs 1,400 pounds. I sell him for $4\frac{3}{4}$ cents per pound, which makes \$66.50. Deducting the cost, \$48, leaves me a net profit of \$18.50. These figures are based on buying and selling at my barns, where I do my feeding.

I shipped one car of mixed cattle to Indianapolis, consisting of cows, heifers, steers and a bull. The cows sold for $4\frac{3}{4}$ and the balance of the load for 5 cents. I have never counted the labor and care of feeding anything, as I think the manure pays me well for the trouble. My hogs work it over and get more or less food out of it, and my land gets the balance.

In making up the cost of my feed, I arrive at it in the following way: The breaking and cultivating of one acre properly cost \$5.60; cutting up the corn and putting it in the silo, cost \$6.40; the use of an acre of land,

\$6, which would make a total of \$18 per acre. The average yield is something over \$15 tons, making the ensilage in the silo cost about \$1.20 per ton. The detailed items to make up this amount would be as follows:

Breaking one acre	\$1 50
Pulverizing	40
Planting with drill.....	40
Harrowing twice	80
Cultivating	1 00
Cutting up of corn	1 50
Loading on wagon	1 50
Hauling to cutting machine.....	2 50
Running through machine and elevating into the silo and properly tramping	2 90
Use of land	6 00
Total	\$18 00
Making up cost of ration—	
60 pounds ensilage	3 6-10
9 pounds hominy hearts	6 3-10
6 pounds bran	3 6-10
Total	13 5-10

One acre of ensilage of 15 tons will make 500 days' ration for one steer. Mixed with 4,500 pounds hominy hearts and 3,000 pounds of bran, when put together, amounts, in dollars, to wit:

15 tons ensilage	\$18 00
4,500 pounds hominy	31 50
3,000 pounds bran	18 00
Total	\$67 50

This amount of feed will produce 1,500 pounds of flesh at 4½ cents, which equals \$67.50; 4,000 pounds before feeding, at 3 cents, \$120; total cost of 5,500 pounds, \$187.50. The 5,500 pounds, ready for market, is worth 4¼ cents, or \$261.25. Deducting the cost, \$187.50, leaves a balance of \$73.75 clear gain, taking the land for the basis to start on.

EDUCATION AND THE HOME.

EDUCATION FOR THE FARMER.

BY R. R. HENRY, M'CUTCHANVILLE.

[Read before the Vanderburgh County Farmers' Institute.]

I was very much surprised some time since in reading in an agricultural paper an article entitled "The New Education," to find that the distinguishing feature between the old and the new in the primary class was the drawing of pictures on a blackboard with both hands at once, doing it rapidly first from copy, then from memory and last from original designs.

It seems, from the writer, that almost ever since the dawn of civilization we have had one active and one passive hand, so that we have developed not only one-sided bodies, but one-sided and feeble minds.

Now, using both hands at once, the writer claimed, would work wonders in developing well-balanced bodies and minds, besides cultivating alertness of attention and training the body to execute the designs of the mind with promptness and accuracy.

If any one needs an active, well-developed, well-balanced mind, with hands ready to execute its designs speedily and with precision, the farmer does. He must be a mechanic. The use of machinery is so general and necessary that all must use it more or less. Think how much time, patience and money is wasted every year because farmers do not know how to adjust the parts of a "binder" or tell which part is out of order. He must be a business man; not only must he use business methods in the management of his farm, but should be informed as to the general business condition of the world and the trend of the times, or, as another has put it, "The farmer of the present and future must be a man of resource; he must be ready to adapt himself to new circumstances and to adopt new crops when he finds he is undersold; he must look upon the soil and air as his agents for the production of vegetable and animal forms, the precise type of which must depend upon the laws of supply and demand. If a manufacturer finds that he has a strong competitor in the sale of lamps, he turns his attention to locks or to something else, and so must the farmer. He should be a botanist, and know the habits of growth both above and below the ground; also the time and manner of seeding, not only of the useful plants but of the weeds and troublesome plants, that he may successfully and economically destroy them. He should be a geologist. How much are we losing every year by insects? Are we Americans,

who boast such great things, going to let such little things as grasshoppers and chinch-bugs defraud us out of hundreds of dollars every year?

But we already know on how many different lines a farmer should be educated and how far short of the mark most of us are. Where can this all-around education be obtained? For a large majority it must be obtained on the farm and in the country school. And, like other places of education, it has its advantages and inconveniences. We who are over forty years of age did not have a chance to draw pictures with both hands at once, but had to go back to the methods of our ancestors and have an active and passive hand—the passive left hand carrying a wet spot on the under side and holding a book like a shield to ward off the darts from the teacher's eyes, while the right hand drew the picture. If the afore-said darts struck the book, the passive hand automatically drew back, the wet spot touched the slate and all was blank; but in the evening we were given a milk pail, with instructions to milk with both hands and be sure that the left hand did its full share of the work.

And in harvest time we were taught to shock two sheaves at once and be careful to set them both at the same angle and equally firm.

So in much of our work and many of our chores we found a chance to use both hands at once, and in spite of wrong methods at school we received some of this two-sided education. There is no place like the farm to afford opportunities for object lessons in the study of plants and animals. If our children could make use of these opportunities by having a summer kindergarten out of doors, where instead of fighting the heads off the violets as we did, they could learn the ways of the plants and animals around them and gain habits of investigation, observation and attention to be supplemented later by books and drawing with both hands at once. We would have a good foundation for a useful education and if the slight knowledge gained by the use of farm machinery could be supplemented by a little systematic study of mechanics, our boys, and girls too, would be fitted for intelligent farm work and citizenship, or to go forward in their studies as circumstances would permit.

To put air and water into salable form is a neat bit of science which may be done like a parrot talks, but if done intelligently will be more certain in its results and afford more pleasure in the doing.

In every agricultural problem there is the science side and the farmer side, the latter being often the more difficult. The farmer stands between principles on the one hand and the conditions of his farming on the other, and out of the proper application of principles to conditions comes correct practice. Other things being equal then the farmer who has the best knowledge of principles has the best practice; in other words, the educated farmer may be the best farmer.

We should strive to produce the best of everything. Any reasonable expense to produce extra quality, together with extra care in the selection, and care of the best varieties will usually bring the desired end. The

farmer of to-day must not have an idle acre. He must plan judiciously and attend to the smallest details of his business if he would keep up with the rush of to-day. Although we recognize the fact that the prices received for farm produce are not always what they should be, and the farmer in most instances has not been enabled to become as rich in a short time as those of other occupations, yet statistics show that the per cent. of failures among farmers is less than in any other class.

Then in view of our many advantages let all unite in their praise and encouragement of this "the most healthful, most useful and most noble employment of man." Let us then stand by agriculture patiently working and waiting so that when Uncle Sam calls our boys shall all be ready by education and training to do the right in the best way, either with a ballot in each hand or as a "rough rider" with a revolver in each hand.

A PLEA FOR THE INTELLECTUAL, MORAL AND SOCIAL ADVANCEMENT OF FARMERS' WIVES AND DAUGHTERS.

BY MRS. EMMA CUMMINGS, MARSHALL.

[Read before the Parke County Farmers' Institute.]

The conservative feeling which once hedged a woman into a narrow round of domestic duties is fast disappearing with the advancement of the age. It is no longer considered the wife's mission to lead a life of constant drudgery exclusive of all intellectual and social enjoyment. She is granted the right to a standard of wifehood and motherhood which goes beyond simply the duties of cook, housekeeper and nurse, to that of an intelligent, independent woman. The true woman, conscious of her ability for something better, resolves that she will not close her eyes and ears to everything outside of her household affairs, and thus become narrow-minded.

The nature and development of children require, more than all else, the attention and consideration of intelligent women; otherwise it is impossible to realize the earnest need for efficient government in the family. The woman who would be worthy the name of wife and mother will make an effort to enlarge her mental horizon, and thus become a more intelligent companion for husband and children. How are we to do this? Many of us may depend largely on our reading for those things which lift us out of ourselves and give us tastes of a better life. We must take advantage of every opportunity to inform ourselves on whatever will tend to mind culture. If the Farmers' Institute is for the advancement of the farmer, why should not the wives and daughters derive some benefit from the same source? We believe that what tends to elevate the farmer and his work is also beneficial to their wives and daughters. When the time

comes that they shall take an interest in this work, and be ready to lend a helping hand, then we believe these Institutes will be of great benefit to us.

We next turn our attention to the moral and social achievements. We need a standard of pure morality to be felt and recognized, which, as a regenerating force, will enter our social circles and elevate them to their highest possibilities. How shall we bring this about? We must begin at home, for the home influence is beyond all other influences. Our daughters can have no better moral education than that which a mother can give in her every-day life. If her influence is used in all gentleness, patience and charity, and her heart's desire is "that our daughters may be as cornerstones, polished after the similitude of a palace," then there need not be a great deal of anxiety for the daughter's future. She may never be a brilliant star in the social circle, or become what the public would call a great success, but she will be what is better than either—a good woman and the light of some one's home.

We have already spoken of the good results of home influence—the home must come first—but this does not mean to stay at home always. If we care only for home, we are in danger of being selfish. A change is good, in fact is very essential for any one; and the woman on the farm, whose work seems such a ceaseless, monotonous round, needs this change very much, indeed. The very fact of seeing other faces takes us out of ourselves, imparts new ideas to us, and takes us away from the worry of what lies ahead.

If we need encouragement in our work, that will help to lighten our burdens, make our lives broader and ennoble our work, where can we find a better place to come in contact with such help than in these Institutes? Here is open to us a field of relaxation among other women, and we can meet upon a common ground for intellectual advancement. Here we can meet with those influences which will lift us out of our own environment to the larger plane of other lives, which will eradicate from our minds the thought of drudgery, and fill us with courage, endurance and high purposes. Those who have been awakened to a clear sense of what their duty is to themselves and their sisters in the work, and who are willing to work for the general good, are the ones who will constitute the necessary elements of these Institutes.

When women learn in very truth the extent of their power for helping others, and make use of that power, not for notoriety, not for amusement, but simply for the sake of doing unflinchingly what seems the right thing to be done, then will their example prove a helpful inspiration to countless numbers and to generations unborn. A benediction will surely fall on the mothers and daughters throughout the world who, making a good home, scatter the blessings of such a home wherever they go.

RELATION OF THE SCHOOL TO AGRICULTURE.

BY E. M'FARLAND, SHOALS.

[Read before the Martin County Farmers' Institute.]

Mr. President, Ladies and Gentlemen—I regret that your good President did not tell me earlier that I might use some of the time allotted to this valuable meeting in saying some things that I should like very much to say to the farmers of Martin County.

I wish to congratulate you on the profitable meeting to the farming industry now in session, and I especially want to congratulate Martin County on this movement towards scientific farming.

The chief material wealth in Martin County lies in its farm and stock lands. The great problem with us, one and all, is how to develop and stimulate these two great industries. It is manifest there is a science in farming. There are scientific principles that underlie its successful growth and development.

This is an age of science. We have reached the scientific age. We enjoy a science of medicine, a science of law, a military science, a science of education, and, it appears, a science of farming. My good farmer friend, there is a science underlying your profession. It is pre-eminently an art, having its root reaching down into science.

I do not come before you to speak on the science of farming—I could not do that. I want to tell you briefly how, I think, we can stimulate a greater interest and reveal to the youth of our county the great wealth and fascination there is in this, the most scientific profession of all professions.

There is an inter-relation among the different professions; their highest usefulness is secured only by co-operation. It is a vital error for one professional class to stand in opposition to another. We are mutually and necessarily dependent one on another, and therefore are equally interested in the highest growth and perfection of each other.

We agree that the farming class is the cornerstone of all classes. The farmer's prosperity is necessarily our prosperity; his decay and burden is inevitably our decay and burden.

Now, as the head of your school system, it becomes my imperative duty to direct the school so that it will improve the industries of the county as well as give social and intellectual culture. Evidently the greatest question of the hour for the school is, How can we stimulate the growth and development of the farming industry?

I beg to speak briefly of what I consider our obligations are to you, and some of your obligations to the schools you help to support. The schools must prove a paying investment. We are under obligations to

bring about material improvement in the industries of the county. We are under obligations to produce better farmers and better farmers' wives. In other words, we are under obligations to solve this great problem of material growth and perfection in addition to giving social and intellectual culture. The opinion is too general that the farmer's education need not extend beyond the three R's. His profession is by nature scientific, and therefore his education should be scientific and practical, as well as æsthetical and ethical. I am out of favor with education that stops with social, intellectual and moral culture and turns the farmer boy out with no ability to distinguish a Durham from a Jersey or a cabbage head from a squash. We believe the aim and constant effort of the school should be to give social, intellectual and moral culture, and material improvement to the country that supports it.

Now, what are your obligations to the school? What can you do to enable it to do the work assigned it? Briefly you are obligated to support it so long as it returns value received. It is your duty to provide the required aid necessary to enable it to accomplish the work assigned it, and do your part in keeping the children under its influence long enough each year to solve the problem in the time allotted.

To be brief, gentlemen, I claim the material inducements at our hand are not in proportion to the problem to solve. Our terms are too short and our wages are inadequate to secure the talent and skill necessary to meet, what I consider, the greatest question of the age.

I beg you to weigh the importance of a correct and speedy solution to it, and if our plans and methods are correct, I ask you to give us the necessary means and support.

Why this stream of migration from the farm to the city? I attribute it to the fact that most parents do not realize the beauty, fascination and wealth there is in scientific farming, and therefore the boys and girls seek the fancied higher life of the cities and towns.

The root of the disease is lack of the right kind of education. Education reveals man's self and surroundings to himself. Give us the right kind of education and the stream of migration will flow toward the farm.

SHOULD THE ELEMENTARY PRINCIPLES OF AGRICULTURE BE TAUGHT IN OUR PUBLIC SCHOOLS?

BY MRS. J. W. MILLS, LAGRANGE.

[Read before the LAGRANGE County Farmers' Institute.]

In almost every avocation of life there is a recognized system of training and education for boys and girls to fit them for future usefulness. To be entirely successful one must have an object for which to work; then he must bend every energy in that direction.

Our professions are full of good men and women who have spent almost a lifetime to make their work a success and have concentrated all their forces to work out a life plan.

The secret of success in life is a continued effort along some line for which we are naturally fitted and which we believe in and will work for with all our might.

It is safe to say that every child reaching the age of fourteen years has some crude, half-formed idea of what he would like to do and be. We can not educate a boy in theology, medicine or law and then immediately convert him into a scientific, practical, successful farmer. We must have special education or training for special needs. If our boys and girls are to be farmers, we must teach them something of plant life, how they grow and why they grow. We must teach them something of insect life, since we learn that four-fifths of all the animals in the world belong to this class. We must teach them to know the habits of, and to love, our domestic animals, thus early instilling in their minds the great law of kindness which every one of God's creatures deserves at our hands. To be sure they observe all these things in a general way, but they do not see them intelligently. They have no special interest in them, but take them as something provided by nature in which they have no special interest or concern.

A man who wishes to make a farmer of his boy must teach him, from his earliest childhood, to respect his father's calling. Do not teach him that all the bright boys should seek a profession and that only the dullard stays on the farm. You must magnify your own calling. You must impress on his mind that some of our greatest men spent their early life on farms, and there learned habits of industry and frugality, and in healthful, happy employment grew into robust manhood with physical strength to enter into any position of life.

Have confidence in your boy. Plan with him. Make him have an interest in your work by being interested in his work and plans. Have the confidence in and good-fellowship for him which you had for the friends of your youth. It will require some effort, but it will pay. You are not only raising a farmer, but you are training an immortal soul, and you are largely responsible for his character-building every day.

For several years past the tendency of the people has been to rush to the city or village, possessed with the idea of making money quickly, of being well dressed at all times, and escaping what they consider the drudgery and routine of farm life. The result is the cities are overcrowded with disappointed men and women who are half fed and half clad. Boys and girls, for the lack of employment, are driven to crimes which country children never dream of.

The tide seems now to be turning in favor of the farmer's boy and girl. People are waking up to the fact that our country children may be as well informed as their city neighbors.

With the help of agricultural schools and colleges, township graded schools, public libraries, reading circles, farmers' clubs, good music, telephones and the hope of a free mail delivery, we are beginning to see a silver lining in the dark cloud.

I must not forget the Farmers' Institute, which has done so much to make country people better satisfied with farm life. It is doing much to break down the imaginary social barrier between country and town. It is a school for farmers and their wives. It is a place for exchanging good thoughts and plans of work. It is promoting sociability and a desire to be progressive and up to date in farming as well as in general knowledge. It makes us realize that it is better to have our boys and girls go steadily forward, one step at a time, putting the foot firmly down on ground that is solid, than to take vast leaps into the uncertainties of city life.

Since the farmer feeds and clothes the world, we would say decidedly, yes, let the elementary principles of agriculture be taught in our public schools.

In the discussion of this paper Mr. E. G. Machan said he was agreed that it would be well and profitable to teach the principles of agriculture in the common schools; that the best way to facilitate this would be to consolidate the country schools.

Mr. H. F. McMahan said farming is becoming one of the learned professions in which, if we succeed, we must use our brains in connection with our hands. Agriculture should be taught in the public schools. Whatever profession your boy chooses, he must have an education to fit him for that position. Do not think, because he chooses farming, he needs no education, for I say he does, just as much as in any profession.

Mr. Husselman was very emphatic when he said agricultural science should be taught in the public schools.

THE HOME, AND WOMAN'S PLACE THEREIN.

BY MRS. FRANK M'KINNEY, NEWTOWN.

[Read before the Fountain County Farmers' Institute.]

"The Home and Woman's Place Therein." Home! Whose heart does not thrill at the sound of that word, whose inmost feelings are not stirred to their depths at memories thus awakened? Poets have sung of it, sages have written of it, people of all ages, classes and conditions have ex-

pressed their love for it in word and action. Hear of the "Wanderer's Love of Home:"

"I've traveled east, I've traveled west,
I've reamed through many lands,
The while Time's hour-glass, changing still,
Ran down its golden sands.

"A rolling stone ne'er gathers moss,
Nor hearth nor child have I,
Yet weary, sick, and racked with pain
I would go home to die.

I fain would lay my head once more,
Upon my mother's breast,
And give my weary, homesick soul
One hour of perfect rest.

You ask why this is? What power or magnetism draws with such love to our homes? It surely can not be the house wherein we were born that causes this deep feeling. No; the magnet is the kind and loving mother that dwells within that home.

"To learn such a simple lesson
Need I go to Paris or Rome—
That the many make the household,
But only one the home?
'Twas a smile, 'twas a garment's rustle,
'Twas nothing that I can phrase,
But the whole dumb dwelling grew conscious,
And put on her looks and ways."

These are the words of James Russell Lowell which so admirably express my thought. One writer says the organization of the home depends for the most part upon woman. She is necessarily the manager of every family and household. How much, therefore, must depend upon her intelligent co-operation? Man's life revolves around woman. She is the sun of his social system. She is the queen of domestic life; the comfort of every home mainly depends upon her—her character, her temper, her power of organization and her business management. She must have the oversight of the whole house from garret to cellar; in the kitchen, to so manage the meals that they may be well cooked and well served, that the daintiest appetite is tempted and the greatest appetite satisfied without injury to the health. She must carefully prepare the bill of fare for each meal, of which there are three a day seven days in the week, that they may not be a repetition of each other, for you know "variety is the spice of life," and I think it very applicable to the meals. The woman also must care for the milk, churn the butter and bake the bread. In short, all the minutia of housekeeping, that only a woman can understand; and over all she must keep a watchful eye, that the expenses do not exceed the income. I believe the woman should understand her husband's business well enough that she may plan the household expenses intelligently.

Just let the woman know this or that luxury can not be afforded and she will cheerfully accept the situation. She should, under no circumstances, go beyond their means.

Now, let us consider the social side of the woman's life, for we are created social beings, and, like the house plants we cultivate, the ones with the proper amount of sunshine and water are the more thrifty and beautiful, and thus with the proper amount of social enjoyment, if it be pure as the sunshine, will cause us to grow beautiful in character. We should cultivate a happy, sunny temper and pleasant manners, if we do not already possess them, always looking on the bright side of life, showing genial good will to all with whom we come in contact, inviting to our homes those who possess sterling character, high aims in life and a desire to make the world better for having lived in it.

I have purposely left until the last the highest privilege given the human race, and it is granted to woman—the training of the young in our homes. How many cultivate from early spring, and prune and train in the shape they desire all through the summer months; then with what anxious anticipation they watch the unfolding of the blossoms in November, when the chrysanthemum bursts forth in all its glory. But, ah! how much more beautiful is it to watch the unfolding of the little blossoms God has given us, to train and mold into true and honest men and women, fit temples for the indwelling of His Spirit!

Dear sisters, can we ask more rights than we already possess? Surely not, if we realize and appreciate the privilege of helping to make beautiful homes. Does some one say I have pictured a Herculean task in the multiplicity of duties? Let me quote from the poet:

"Tired? Well, what of that?
Didst fancy life was spent on beds of ease,
Fluttering the rose leaves scattered by the breeze?
Didst fancy life one summer holiday,
With lessons none to learn, and naught but play?
Go get thee to thy task! Conquer or die!
The lesson must be learned. Learn it then patiently."

THE FARMERS' LIBRARY.

BY MRS. E. M. BROWN, FORAKER, IND.

[Read before the Elkhart County Farmers' Institute.]

We all recognize the facts that chief among the educational influences of the household are its books and that foremost among the needs of the American farmer are knowledge, intelligence and mental strength. It is intelligent methods more than hard manual labor that insures success to the farmer of to-day. He must produce the best at the least cost, and

in order to do this he must be a reader and a thinker; he must familiarize himself with the varied conditions of production, prices and trade and supply and demand in all quarters. All this means mental labor as well as physical.

While it is true that the life of the farmer and of the farmer's wife is a busy life and that their opportunities are limited in certain directions, yet they enjoy many an opportunity that is denied those living in the city and by careful economy of time they can, with a few spare moments each day devoted to study, in time acquire that knowledge necessary to work intelligently and that mental culture which will enable them to better appreciate the blessings of their vocation and lift them out of the monotony of daily life.

In "The King's Treasuries," Ruskin speaks of how we covet the society of the great—the wise and noble—and how eager we are to catch a word falling from the lips of a poet, a statesman, a king or a queen; and yet, he tells us, there is such a society continually open to us of people who will talk to us as long as we like, whatever our rank or occupation, talk to us in the best words they can choose and with thanks if we listen. To this society we are invited. We can sit down in our own pleasant room, hidden behind the two boards that bind the book, and listen all day long, not to the casual talk, but to the studied, determined, chosen addresses of the wisest of men.

The farmer, by reason of his calling, is much alone; he has not the society of his fellows as the city brother has, consequently if left to himself he is apt to become narrow. The remedy for this, then, is for him to surround himself with this society of the great and noble of whom Ruskin has so beautifully spoken and which we will call the Farmer's Library.

A little library growing larger every year is an honorable part of any farmer's possessions and will be a source of the best happiness and progress of his family. It may be small to begin with, but by all means let it be select. I believe that I am safe in saying that the farmer, more than any other class of people, has a chance of knowing the nature of the company of his children, and while he has this opportunity for the guarding of his household let him be no less diligent with regard to the companionship of books.

As to the subject-matter of the farmer's library, I would not presume to advise, but, having had access to articles written on this subject by those who have had wide experience, I feel safe in recommending what they have suggested. At the head of the list we will agree in placing agricultural books, for, just as the lawyer or doctor needs books to keep him informed concerning his profession, so should the farmer take pride enough in his vocation to prompt him to study it in all its details. He should have works relating to the general subject of agriculture, and, if he be a specialist, books relating to his own specialty. It is scarcely need-

ful to add that, aside from such books for his study, he needs to be a careful reader of some good agricultural paper. Aside from books relating to agriculture, such as fertilizing, drainage, etc., there should be books on the natural sciences—botany, geology and zoology—and works pertaining to the science of government and political economy.

The farmer wants to be many-sided, and in order to be so he must read other works aside from those pertaining to his vocation. For this broadening out he must read some good works on history and travel; neither must he neglect the means for self-culture furnished in the rich field of literature. Do not be too afraid of fiction, for often a piece of good fiction is truer in all essential elements than a standard history; only be sure the influence is good. As a part of this library some good magazines and newspapers are also needed.

The books, magazines and newspapers mentioned in this paper are not all by any means that should be found in the farmer's library, but what has been said will suffice to show that he has a vast field in which to work. Let not the question of time discourage you. I know full well that there is always something yet to be done on the farm, but for all that you can not afford to neglect your intellectual life. A half hour each day devoted to reading will only rest the weary muscles and give added strength when the work is again taken up. Neither let the very "muchness" of the work discourage you; only make a beginning. Let the example of Franklin be an inspiration to you. He had only the odds and ends of time between work for study; he, like many of us, did not possess the advantage of studying under teachers and being guided by them, but his education progressed under the supervision of his own mind. He had to correct his errors as the dawning of new light enabled him to see them. We, with a few acquirements now and a few advantages, may do the same.

ARRANGEMENT INDOOR AND OUT.

BY MISS HARRIET M'OOT, CLOVERDALE, IND.

[Read before the Putnam County Farmers' Institute.]

Inventions for lightening labor and lessening expense in agriculture are numberless. There is no toll of the farmer but some labor-saving method has been applied. While it is gratifying to note all this progress on the farm, yet, when compared with the conveniences found in and about the home it may be clearly seen that the inventive genius has given very little attention to the needs of the toiling housekeeper. To make amends for some of this neglect and point a way for improvement is in part the object of this paper.

The Hoosier pioneer, for the most part, was of southern origin. He brought with him notions acquired and practiced in slavery days, and it is natural that the northern farm should resemble the southern plantation in its arrangement of buildings. To these notions may be traced many of the irregularities and inconveniences of the farm buildings and their relation to each other. In those days, when labor was to be had for the commanding, there was some excuse for this, but that time has long since past; we should keep pace with this age of progress and make improvements on the old plan of arrangement.

It is this lack of progress on the farm that drives so many of the younger generation into other occupations and causes them to flock to the already overcrowded cities for employment, as well as for social advantages. If for no other reason than this, home life on the farm should be made more attractive and less a life of constant toil and sacrifice.

There is no calling more in need of direct practical education than that of farming. Farmers are entitled to all possible general culture that may come with special training, and we believe that for the future prosperity of agriculture this special training is necessary to bring farming to rank with other professions, when the farmer will no longer be stigmatized as a "hayseed" and the young people on the farm as "country jakes." In selecting a site for the house, the view, elevation and convenience of the location should be considered. If the site selected permits, the house should front toward the east, so the kitchen will be sheltered from the morning sun, during working hours, and the leisure hours of the afternoon may be spent more pleasantly in the front part of the house.

Not only for the sake of convenience, but also for appearance, there should be as much under one roof as possible. The wood-house smoke-house and wash-house may be under the same roof as the house and look much neater than four separate buildings, besides being more convenient. One often sees farms where the great number of buildings scattered promiscuously around gives the appearance of a settlement, built without any plan or regard to regularity.

The yard should be of medium size, so that only a small amount of labor will be necessary to keep it nicely. On the average farm the lawn gets very little care, but the farmer who takes appearance and neatness into consideration should feel amply repaid for the little time and labor it costs, by the improvement in appearance by having a well-kept lawn.

At the back, and adjoining the yard, should be the garden, which should be enclosed by poultry-proof fence and be large, for small fruits as well as vegetables. The small fruit garden should be considered of equal importance with the vegetable garden, and both may be in the same enclosure and save fencing.

The house should be so arranged that rooms not in use may be closed and not used as a passway. In the dining-room this is especially desirable. It can then be closed the table covered and left set, which will save a

rush in arranging the table and preparing the meal at the same time. If possible, have an east and south exposure for the family sitting-room. All bedrooms should be entered from the hall, or without passing through one to another. They should be sufficiently large to contain the necessary bedroom furniture without crowding. It is a great mistake and a very common one to make bedrooms too small. There should be plenty of closet room, for no bedroom is complete without it. The arrangement in and about the kitchen deserves special attention. In this department is the greatest need of labor-saving methods.

If there is one class of women, more than another, who need the best conveniences to be had, it is the women on the farm, where there are so many kinds of work to task a woman's strength, even with all the conveniences.

It is my wish to make some practical suggestions on arrangement and conveniences in the culinary department. To begin with, the room must not be too small and should be light and airy. Then there will be no need of a so-called summer kitchen, which is usually built away from the main building and causes so much inconvenience going back and forth. It seems to me that a better plan would be to save the expense of that extra building and furnish a kitchen for all the year, with the best labor-lightening conveniences.

The ideal floor covering is linoleum. For all shelves white oilcloth, instead of paper, will save the time and labor of changing papers and will always be clean and neat with a little care.

Have the kitchen table covered with zinc, which is superior to oilcloth in many respects and is just as easily kept clean.

For convenience in serving, have a pass between kitchen and dining-room. The door between these rooms should swing both ways and close automatically.

No kitchen is complete without a pantry, but don't make the mistake of having no window. Have it light, even if it does cause extra care to keep it clean for inspection. Here a small pump, with pipes to the cistern, will be quite a convenience, as will also a waste-water sink and washstand.

For convenience, the cellar should be under the kitchen and a dumb-waiter running from kitchen to cellar. It should have shelves which could be removed to carry jars and such like. This will save many a tiresome trip down the cellar steps. You, perhaps, may see no need of a dumb-waiter, when one of the talkative kind would do as well, but when there are so many trips to be made to the cellar you will find it an advantage to have one that can do no grumbling. The cellar should have two departments, one for winter fruit, vegetables, etc., the other for dairy purposes. For it is impossible to keep milk and butter free from impurities in the same room with the vegetables.

The cistern and well pumps should be convenient to the kitchen, if possible under shelter, with tile to lead off the waste water.

Adjoining the kitchen is the wood-house, a part of which should be floored with cement or brick and will be a convenient place for washing, rendering lard and such work that is usually done out-doors, no matter how disagreeable the weather. Much more might be said by entering into detail more minutely. But I have tried to make some general suggestions as to a better plan of arrangement, together with a few special conveniences in and about the kitchen. It is to be hoped that in the near future conveniences for the home will be thought of as much importance as those on the farm. But while we are waiting for the genius of invention to introduce a method of housekeeping by electricity, when all that will be required of the housekeeper will be to "push the button," we should make the best of our present opportunities by using the inventions and conveniences we now have and study the best method of reducing the labor of the housekeeper.

MISCELLANEOUS.

DOMESTIC ECONOMY.

BY MRS. CHARLES SEARS.

[Read before the Lagrange County Farmers' Institute.]

Domestic pertains to house and home—one's place of residence, and to the family, as domestic duties, domestic affairs, domestic happiness.

And economy, we find, is careful use of money, judicious management of house and home. Economy, when carefully practiced, pertains more to domestic duties, affairs and happiness, than any other word we can use with domestic. Economy is foresight and management. Economy, a virtue so little appreciated, and so worthy of estimation; and who does it refer to more than the wife and mother, when the happiness, comfort and independence of the family depend upon her judicious management and careful use of money at her command? For, are not many homes ruined, many a man bankrupted, by the extravagant, careless, wasteful way of the wife? For, if we buy everything we want or think we want, we will soon want for things we can not buy. Therefore, it becomes our duty to be economical. Economy never goes in debt for unnecessary

things—I say unnecessary, because as a rule debt is unnecessary. Did you ever notice, in looking over the dry goods, grocery or millinery bill, how many things you could have done without, or would have done so, had you not been able to get trusted, or had you waited until you had money to pay for them? Another thing, when we come to pay for these bills we need something else just as much, and have to go in debt again. Debt! What a monster it can be if allowed full sway! How it robs us of our independence and happiness! For what enjoyment do we find in nice furniture or fine apparel if we owe for them? If your means do not suit your ends, pursue those ends that suit your means. It is the privilege of every farmer's wife, and I might say duty, to see to it that she has an income from the farm which is hers to use as she pleases. A nice flock of Plymouth Rock chickens and three or four turkeys; two or three or even four cows, are very necessary and will do much, if not all, of the table furnishing and keep up other small household expenses; and every fall you may sell \$50, \$60 or perhaps \$100 worth of poultry. But you say this makes us so much work. Let us investigate this: Where can we pick up money easier than by caring for our poultry and hunting eggs?—and most of us have little ones who dearly love to find them. The cows, of course, make a great deal of work, but if we have to make butter at all, most of us would rather make some to spare than just enough for the family, and find it not much more work. We have to strain, skim and churn a little more, but the time is here, farmer sisters, when we need not do all this work to get the money for our milk. The creamery is in our midst, and I believe we can get more for our milk by letting them do the work than in the old way, because the price of butter is very low most of the time at the home market. So, if we can sell the milk for cost at the door, I think that is the proper thing to do, or if we can not do this we must find a market for our butter elsewhere.

Now, then, with cash for the milk or butter, and a few dozen eggs for sale every week, we surely ought to keep up the little household expenses, and when the husband sells stock or grain we may have some of the larger necessities in the home, if he does not owe too much at the bank, and some sale note or machine note is not due.

We can not afford to let the husband go free in this matter of domestic economy. We want a good garden and small fruits furnished in abundance to help us to economize. A great deal has been said and written on this subject, but not enough yet, for many farms are still destitute of these luxuries, and the wife and daughters will spend a greater part of the day hunting along the fence row or in the woods, or even drive a few miles to pick berries on shares for table use; and who enjoys these dishes better than that same farmer, who hasn't time to fence in a garden or cultivate small fruits? Brother farmer, if you have not attended to these domestic affairs, you had better do so in the spring.

We don't like economy when it assumes the form of stinginess, when

we must deny ourselves every amusement, recreation and comfort of life. Music is usually valuable as a home amusement. Parents should not fail to consider the great value of home music. Buy a good instrument and teach your family to play and sing, that they may produce sufficient amusement at home so that the sons will not look elsewhere for it, and thus often be led into dens of vice and immorality. The reason so many of them become dissipated and run into every place of amusement, no matter what its character, making every effort to get away from home at night, is the lack of amusement at home. Make home happy, make home attractive. Music affords a means of doing this; music is an economy. For recreation or rest, we want good books and papers, and the farmer's home should be well supplied with these, and the mother should not mar the pleasure of her family by having so much to do that she can not join them for a little time at noon and evening for this recreation.

We now discuss economical comforts in the home: The time is past when we should run to the barn or half way for well water; to a barrel or tub at the corner of the house for rain water, and into the back yard for our wood. And I am glad to say that not many farm houses have things in this condition now. Our husbands do not consider it expensive to have water piped to different parts of the barn and yards for stock, and with the same expense, and perhaps less, it may be piped into the house; and rain water, even if the cistern is a few feet from the kitchen, should be piped and a pump placed over a sink. The sewing machine, washing machine, wringer, crank churn and, I might add, the refrigerator and gasoline stove are a few of the home comforts, and should be added as our means will allow. But you will say I am getting extravagant instead of economical, but I say, not at all. The refrigerator, for instance, our town sisters think they can't do without, though they buy all their ice—yet consider it economy to have a place for two or three pounds of butter, one or two quarts of milk, a few quarts of fruit, etc. How much more do we need one in the country, where we have so much more of these things to keep at once, and ice costs nothing but the labor it takes to store it in the ice house? The other articles I mentioned are an economy because they help us to economize time, enabling us to do in one-half day what would otherwise take all day, giving us a little spare time for recreation and social life. I have no patience with that old saying, "Man's work is from sun to sun; woman's work is never done." I will say, in conclusion: Teach your children to be domestic, teach them economy, making of them helpers, and when they go forth to make homes of their own they will be better able to battle with domestic duties, enjoyments and cares of life.

GIVE THE WIFE A CHANCE.

BY MRS. HARRIET J. LINDLEY, WESTFIELD.

[Read before the Hamilton County Farmers' Institute.]

One characteristic of the American is his energy. This country was settled by energetic men and women who revolted against religious tyranny, political intolerance and the distress of poverty. The fact that they sought new, broader fields showed them to be men of decision and action, and new blood of the same character has been constantly flowing in from all Europe. There is no country where there is such an incentive to labor. In many European countries a man can not hope to attain to a higher position than the one in which he was born. Here he may climb from the humblest walks in life to the highest in the gift of the people, as exemplified in the lives of Lincoln and Garfield. A man's social standing here is only limited by his intellect and his energy. The American farmer and his wife have put forth their best efforts, as the many beautiful farms and farm houses all over this land will testify. The result of this energy is, we are an overworked, nervous people. Our mothers, as well as our fathers, worked too hard, with far worse results on posterity, than the overwork of the father. Show me the woman to-day who can endure what her mother could; but I can show you many women to-day who can stand more labor at forty or fifty than their daughters of eighteen or twenty. This may be due sometimes to the mode of life, but oftener, in my opinion, to the drain upon the mother when she should have had rest and quiet. Most men do provide to the best of their ability. I do not believe there are many husbands like the one who took his wife to our county-seat town to buy a new calico dress, he going along to hold the pocketbook. This story was told me by an eye-witness—a true story. He called for the calico; it was looked at and the dress chosen. He ordered the clerk to cut off eight yards. She (the wife) pulled his sleeve and asked in a low tone if she could not have nine yards, as it was only four cents a yard. He generously consented. Then a few remnants were bought to make the children some clothes. He ordered one spool of thread. Again the sleeve was pulled and she meekly asked if she could not have two spools, as she was fearful one would not do the work. He thought one spool of two hundred yards ought to be enough, but finally consented to buy two, after being told it would be needed for patching. He paid the bill, feeling he had done a nice thing in allowing his wife to select the dress and have an extra yard. I have said I do not believe there are many such husbands. I am sure there are not many such wives. Every wife should make it her business to live within her means. To do that she must know something (or should I say everything) of her husband's business; but every woman, be she the wife of a rich or a poor man, should

have a portion to spend as she pleases. I do not think there is any more danger of her wasting it than there is of his doing so. A dollar usually goes farther in a woman's hands than a man's. She has fewer of them and is more careful how she spends them. I am not one who believes a man should marry a woman expecting her to be self-supporting, by taking in dressmaking or boarders, standing in stores, raising chickens or making butter. If a woman rears a family she should give her time and energies to the care and training of her children and making a home for them and her husband. The training of her children is the one thing she can not afford to neglect or trust to servants, if she can possibly attend to it herself. But I do believe in a liberal education of our girls, so that they may be self-supporting, useful members of society if they choose to remain single, or should marry, and sickness, death or any other misfortune should throw the responsibility of providing upon them. While a young man should not take a wife expecting her to be self-supporting, every true wife wants to help her husband make and beautify her home; and if she has the health, time, opportunity and business ability, she can be a great help. If she is trusted to buy the home supplies, she should study to spend the money in a way to get the greatest returns. She knows far better than he what is needed and what can be dispensed with; and she knows far better than he does what her heart longs for. It may be a book or a picture, but it may be as essential to her happiness as meat, coffee or tobacco is to his, and if she handles the money she will economize somewhere to satisfy that longing for the beautiful. No woman likes to be entirely dependent, especially if she is the wife of a man of small means, struggling to rise in the world. Tastes differ. What may be a luxury to him may seem almost a necessity to her, and if she can have a small income of her own she can gratify that taste without calling on her husband. Whatever may be the method best adapted to the wife living in town, whereby she may replenish her pocketbook, I am not here to say, but to the wife of the farmer living in the country, years of experience have demonstrated to me that no other thing will compare with the poultry yard. Not all wives, nor even farmers' wives, are giants in strength. Milking, churning and everything connected with the dairy down to the working and printing the butter, is hard work. Not so in the poultry business.

Years ago, when I was a young wife, not able to do common housework, my physician told me I must be out of doors more; advised me to take drives and walks. I was too industriously inclined to enjoy walking or driving in the country, unless I had business at the other end of the line. My mind would constantly revert to my babies and many other things indoors that might need my care, and in a very short time I would return to the house. I resolved to walk, hunting eggs, setting hens and caring for the little chickens. I soon became so interested I would find on returning to the house I had been out two hours. I was tired, of course,

but I enjoyed the work and found it good medicine. The feared lung trouble disappeared and I had a fine lot of chickens for my trouble. I do not think one woman can do all her housework and run the poultry business on a large scale, especially if she is the mother of small children or has a large family. My advice would be to such a one (since hired girls are not to be had), send the washing and ironing away and hire a sewing woman to come to the home a week or two occasionally, and have some chickens even if your husband or hired man must assist at times in caring for them. The egg money is yours.

The woman who spends her mornings out of doors must neglect the indoors unless she has help—either her own children or hired help. I have found the poultry business pleasant, health-giving and profitable. If you are a lover of pets, where is the bird that is sweeter than the downy little chicken, who soon learns to run to meet you?

It is much easier and pleasanter to gather the eggs (a whole painful of them; we do not mind the weight if the distance is not too great, when they are 10 or 12 cents per dozen) than to churn and wash the churn and care for the butter, to say nothing of gathering the cream and caring for the milk, even after the husband has milked.

It is such a pleasure at house cleaning time to order a new piece of furniture or a room papered and not have to say, by your leave, but have your husband look up in astonishment and say: "You are a jewel. Where do you get the money?" That was my secret until I was called away from home one spring, and he sold the eggs for two weeks. Since then he can not be astonished, not even when offered the loan of \$50 to bridge over a short time. The question he now asks is: "How much more have you?"

For years our chickens have furnished our meat at least four months in the year; and eggs—there is such a variety of ways of preparing them—who can enjoy them like the farmer's family, who can always have them fresh?

I do not like to speak of private affairs, but as Farmers' Institute workers always tell what I have done, this paper would not be complete without telling what I have done in the home in the last seven or eight years. When we moved into our new house we were more in debt than I liked. I resolved not to ask my husband for money to beautify our home after the first furnishing with carpets, curtains, etc., until it was paid for. It took longer than we expected. The panic came on, and husband had many things he wanted to buy—machinery, carriage and a new piano, which was considered a necessity to his music-loving soul. For years I had been spending my money for groceries, clothes, etc., in every-day affairs. My husband did not know how many dollars I saved him and could not give me credit. We—mother and daughters—began to see the need of new curtains, wall paper, etc., which to a man's eye were as good as new. My daughter said, "Save your egg money and buy them yourself." Since I have been called on to write this paper I have counted up

over \$300 spent in permanent improvements in our home, used for paint, wall paper, curtains, carpet, sideboard, leather couch, rockers and other fancy chairs, mirrors, chamber sets, silverware, table-linen, bedspreads, parlor stand and a tete-a-tete, rugs, book shelves, etc., to say nothing of what we have eaten, worn out and given away. And many, many more comforts and luxuries might have been added if it had not been for the poultry man's arch enemy—the chicken thief. Year after year they have taken my early fries—hundreds of them. Please tell me the remedy. I would not commit a murder for anything, but I have no conscientious scruples about shooting in the direction of my own chicken roost.

Notwithstanding these losses, what woman in the dairy business, with four times the capital invested, can, unaided, make a better showing, financially considered, while viewed from the labor standpoint, if we take into consideration the care of the cows? It is a contrast, and not a comparison.

CONDITIONS OF SUCCESS IN FARMING.

BY MRS. ANNA CAPLE, BRUCE LAKE.

[Read before the Fulton County Farmers' Institute.]

In the twentieth chapter of Proverbs, and the nineteenth verse, you may read these words: "He that tilleth his land shall have plenty of bread; but he that followeth after vain persons shall have poverty enough." The dictionary gives this definition: "Tillage of land is the preparation of land for the seed, as by manuring, plowing, harrowing and rolling and the subsequent work of destroying the weeds, loosening the soil, etc., for the purpose of perfecting the crop." While bread is defined as "the actual necessities of life." So, by a liberal reading of our text, we may find it to promise: "He that thoroughly prepares the ground for the seed and afterward keeps it clean from weeds, and cultivates the soil to prevent evaporation of moisture, shall have plenty of the necessities of life. Here, then, we have a promise, with a condition, and it has seemed to us there could be no more opportune time than this for a short discussion of this promise and its condition.

First comes the tillage or preparation of the soil for the seed. Mr. T. B. Terry, of Ohio, who has spoken to us at Institutes in this county, says tillage is manure. In the New York Experimental Station the yield of potatoes was increased from an average of 275.2 bushels per acre to an average of 343.1 bushels per acre by four extra cultivations, same kind of seed, on plats of ground side by side, and with same amount of the same kind of fertilizer. We hear a good deal about farms running out, and about the necessity of continually renewing them with natural fertilizers,

yet few of us know what a vast amount of latent fertility exists in every soil awaiting liberation at our hand. This fertility is freely obtained by tiling and tilling. Of the tiling we will not now speak, as the benefits are so apparent and so immediate that an argument in favor of tile drainage seems impertinent. But if it be true, as Emerson has said, that under our farms lie other farms equally fertile, of which we get no benefit until we underdrain the farm that lies on the surface, then there are thousands of farms that would respond with increased production were they thoroughly tilled.

To return to the tillage of our farms: Mr. R. W. Clothier, in the December (1898) *Industrialist*, says the soil is practically inexhaustible in nitrogen, phosphates and potash and other plant foods, as only a small portion of these are made available each year; and that there is no other way by which so much plant food can be liberated as by thorough cultivation of the soil. And this thorough tillage or cultivation not only liberates this plant food, but it conserves moisture in a dry season. It also allows the air to permeate the soil, and this is just as necessary to success in crop-raising as moisture. One factor in the productiveness of black loams is the abundance of air that permeates them. Closely following this thorough preparatory tillage comes the destroying of the weeds in the growing crop. "Turn the rascals out" was, and perhaps is yet, a very common expression at the beginning of a new administration, and many an officeholder has been made to feel the effects of this unwritten law. But we farmers are year by year allowing in our fields and gardens, often in our very door yards, the most voracious of robbers. During the heat of the summer months, when our crops need every particle of moisture to enable them to do their best, we allow these robber weeds to come boldly into our corn and potato fields, and when harvest time comes they are still there, as high as our heads, to hinder us while we gather the short crop. Short on account of the drouth, we say; when the truth is, the amount of moisture taken up by the weeds would have made our crops good if the weeds had been destroyed.

Mr. Terry says: "I resolved to do the best I knew how or could find out." Now, how shall we do this? First by the use of the best means at our command of learning new and improved methods. Up and down the length and breadth of our land goes the cry, "Farming does not pay." In a certain sense this is true; farming in the old way does not pay. Neither does the practice of the law or medicine, teaching school or hauling goods in a prairie schooner with an ox team. This is an age of progress, and the person who fails to keep up with the procession will not win the prize. Farming will pay if we get out of the old grooves. But to make it pay will necessitate working as well as praying. 'Tis said of an old colored man that he prayed for weeks that the Lord would send him a turkey for Thanksgiving, but it did not come. Then he changed his prayer and asked the Lord to send him to a turkey, and he got one that very night. So,

instead of asking God if it be His will to give us this or that, let us ask Him to put vim and push enough into us to go to work and get for ourselves. God gives us the chance to work for success with such energy that there is nothing we can not accomplish in time, for He says in His Word that He gave man dominion over all the earth.

If we will quit trying to fill a tub by always taking out and never putting in; if we will quit trying to lift ourselves over an open ditch by pulling at our boot straps; if we thoroughly tile and till our land, saving all the manure to apply to the land, and then turn under crops of clover, we will get the returns in crops of wheat yielding thirty to fifty bushels per acre, and other grains accordingly, and all will unite in saying farming does pay. And we mean this in a broader sense than that of dollars and cents. A successful farmer is not the one who succeeds in accumulating some money by impoverishing his farm and starving the minds of his family. Good farming consists in growing the greatest amount of whatever crop we grow, at the smallest cost, and leaving the ground or soil in the best possible condition for succeeding crops. To do this requires as high an order of intellect, and as great an amount of training as is required by any other business or profession, for the farmer must have a wide range of knowledge to understand the wonderful forces of nature. Added to this training must be a definite purpose. All through nature we find this—no accident, no chance. All is system and order, and the variety of fruit a tree bears this year you may depend upon it for next year—no change because of overproduction or low prices. So we, after careful study of ourselves and our surroundings, take one line of work, follow it and make it succeed. The men who stayed by their horses, their cows and their sheep are now reaping their reward, while those who shifted from one thing to another with the changing price are decidedly left, as they should be. Our text says: "He that followeth after vain persons shall have poverty enough." If we may believe what our ears hear and our eyes see, then surely there are some of us following after vain persons. Who are they? Let us turn the X-rays of farming light on our methods, and see what bullets of ignorance, what tumors of carelessness we shall find. Why, my friends, there is no other business on the face of the earth that would provide a man and his family with even a living, conducted in such a haphazard way and with so little system, order and practical knowledge of the business. And yet, if you ask these farmers to subscribe for a farm paper, one will say: "I know more now than I want to do." Another will say: "I take the Kewanna paper and two Rochester papers and two political papers, and don't get time to read them." Where does that man get any new ideas about his business? He is handicapped; he may work with his hands, but to make a success, muscle must be lubricated with brains. Did you ever notice, as you drive along the country road, how many binders, mowers, drills, hay-rakes, plows, harrows and corn plows you may see in the fields, left just where the work was fin-

ished, or standing unprotected in the barn yard? Perhaps this is one of the vain persons that gives us poverty enough, for these farm implements represent a large cash outlay, and some one must work to pay for them. With the proper care, one set of farm implements might almost last a lifetime. With the care they do not receive they will hardly last five years, and new ones must be purchased to take their places. With the money thus needlessly spent by us, the manufacturer purchases fine clothes and takes his family to California or Europe, while we stay at home and wear old clothes; when, if we practiced the same business methods, economy and system in our business the manufacturer does in his, we might take a trip with our families. Then what about the cows shivering in the shelter of a rail or wire fence and the hens roosting in the trees? Is here another vain person? Straw sheds will afford comfort, if they are not beautiful, and are so inexpensive we will not regret to destroy them when we can afford something better. Every added comfort to the faithful cow and hen will bring dollars into the farmer's treasury. We waste feed, we waste manure, we waste time and strength by not having our buildings arranged to do work in the quickest way. All these are the farmer's capital. If it were not the grandest business in the world, it would not stand the leakage. We have in this country high taxes to pay. Are there waste lands grown up with briars and brush, stone piles and ponds of stagnant water in the fields to plow around on our farms? Let us get rid of them. They harbor rats and rabbits; the rats destroy our grains and kill our young poultry, while the rabbits bring the hunters, with their dogs, to tramp over our fields and frighten our stock, and we derive no income at all to help pay the tax. Let us have a short rotation of crops, that will not only bring renewed fertility to our soils, but will destroy many of the insect pests that are giving us so much trouble. Let us have the biggest and best berries that grow, flowers in the yard and fruit and vegetables galore in the garden.

There is another crop to which we have given no attention so far. I refer to the boys and girls—"God bless them"—the men and women of to-morrow. Have they good reading matter and pleasant games with which to occupy their time in the long winter evenings? Do we try to make home the dearest and best place on earth to them? Do we take any interest in their school work, giving them words of praise and encouragement for good work, and kindly pushing them if inclined to be slow? Do we ever visit the school to know what kind of a man or woman our children are under the influence of? In short, do we take as much apparent interest in these human plants as we do in some new variety of plant or fruit or some blooded stock?

This care of the stock is all right and according to scripture, for Solomon says, "Be thou diligent to know the state of thy flocks, and look well to thine herds." But the same holy word tells us, And ye fathers, pro-

voke not your children to wrath, but bring them up in the nurture and admonition of the Lord."

And now, my friends, in conclusion, let us take courage from this promise coming down to us from Solomon's time. The practical everyday experience of successful farmers proves this promise. There is money in farming rightly managed. The products of the farm have tided our country over more than panic and brought the balance on our side of the account. All honor then to the brave farmer and his worthy wife. Let us do our best and trust in Him who has promised that we shall have plenty of bread.

FARMING AS AN OCCUPATION.

BY EDWIN S. FEE, CLARKSBURG.

[Read before the Decatur County Farmers' Institute.]

In my fifteen years' experience in farming I have nothing so far to regret that I chose it for this life's occupation, though I have always had a desire and interest in it from my youth up.

The few remarks and possibly some very few thoughts which I may present in this paper will be practically from my own experience and observation as a young farmer. We often hear it said that most any body can farm; it does not require education and talent, etc., and so it can be said most any one can be a doctor or a lawyer; but to be a successful doctor or lawyer or to be a success at most any occupation in this world it requires a man of push and energy, and I can say that it hurts no farmer to have a good education. The thrifty, up-to-date farmer of to-day is by no means an ignorant man. Agriculture may be defined as the art of disposing of the soil in such a manner as to make it produce in the greatest abundance and perfection those vegetables and grains which are useful to man and the animals depending on him for subsistence. The earliest efforts in agriculture appear to have everywhere been very simple, and as to the improvement and advancement in agriculture I think it has kept pace or even in advance of some of the other occupations. First, I think one of the secrets of a successful farmer is to have the love and interest of it at heart; he ought to take it from choice and with the expectation of receiving enjoyment from it, not to expect to just eke out an existence and work away in a slipshod manner and be contented to just barely make ends meet, and do any way to blow in the time. Second, I think he needs to be industrious, learn habits of economy, improve his ways by watching the experience of others and in all be up and doing, ever ready to catch new ideas which will help along the line of success. Again he

needs a certain amount of contentment. Of course this can be carried to excess in both ways. There is such a thing as a farmer being too contented to succeed. We often see too many of them about us, but what I mean by contentment is not to be too grasping, too anxious to make it all in one year, or even in several years. Well do I remember of hearing my mother say "Contentment, my boy, is half the battle in this life," and indeed have I found it so many times. We will now take it for granted that a young man has eighty, a hundred and sixty or even over two hundred acres of land and good and all paid for. Then if he has health and the above qualities and has a good, helpful farming wife, I see no reason why he should not live well and be happy in this world. I can not advise any young, industrious thriving farmer to pattern after the example of our honorable President here, by going through this life alone, especially when there are so many beautiful, accomplished and worthy young women in this world who are equally ready to share with him life's battles and pleasures. Each successful farmer needs to study well his farm, see what manner of agriculture it is best adapted to, and then after having found what he then needs to push that well to the front. Get your fields so arranged that you can make a good rotation of crops, have your plans well laid out ahead and then work as well toward them as you can. Consider that your farm is your home; from it you receive your living, your income. With that in view, each one of us ought to strive to build it up, make it better each year rather than on the other hand to let it run down and draw from it all we can without in some way putting back on to it a part if not more than we reap from it. By this latter I mean manure and rotation of crops, rest, pasture, etc., anything to help build it up and get our land in a good state of cultivation. Then I advise to always sow and plant the very best varieties of seed and grain. Of this every farmer has to be a judge and decide which variety he thinks is the best. Again have your seed perfectly clean and free from all other foul or noxious weed seed when you sow. Then try to be ready to sow and plant at the right time. I had rather be a little early than be too late. Always aim to push your work rather than to let your work push you. Then as to the kind of stock we should raise, I advocate it pays best in the long run to handle good blooded stock both in cattle, hogs and sheep. It does not cost any more to raise a good graded animal than a scrub, and besides you get a better growth and always have a market for such, when it is often hard to find a buyer for poor or inferior stock. As to the kind of breeds there is a diversity of opinion upon which is the most profitable for the farmer to handle. As to the beef cattle I rather prefer the Short-horn for feeding purposes; as to hogs, no doubt my friend Mr. Venner can tell us which is the best breed of hogs to raise. In cultivating your crop it certainly pays to cultivate well and give your stock good care and attention. Another little secret of success is to know how to do a thing, when to do it and then stay at home and do as much of it as you can

yourself. What is more beautiful to see as we pass along the highway than a nice farm well fenced, buildings in good repair, fields under a fine state of cultivation, crops growing, pastures cleaned up and then stocked with a good grade of cattle. In short, the farmer who succeeds is the one conducting his business along business lines. This is true of the general farmer, the horticulturist, the dairyman, the feeder, the one who raises poultry for market or the truck gardener. The day has gone forever when one can allow the farm to run itself with all the loose ends which this idea conveys. Expensive machinery must not be allowed to remain out of doors to rust and rot; tools must not be dumped into some neglected fence corner; poultry and live stock must not be forced to go unprotected from drenching rains and wintry frosts. Each well up-to-date farmer needs several agricultural paper, good religious papers and a daily. He should provide his household with good literature. One other topic which I wish to mention for thought is "the boy on the farm." We often wonder why the boy wants to leave the farm for the city, but it is too often, I fear, our fault. There is not much attraction about rising with the sun and toiling till it sets if we receive no words of encouragement. But a kind and generous father will give his children credit for any merit which they deserve. When he meets a neighbor he will speak of our crops instead of my crops; when he gives the boy a calf or a pig and the boy takes particular pains to care for it, making an attractive animal out of it by his special care induced by a feeling of ownership, and if the father sells it for a good price and forgets to turn over the proceeds to the rightful owner, is it to be wondered that the boy loses interest in the farm? Another source of discouragement is a tendency toward complaining of hard times when we should speak otherwise. Look more on the bright side of things. I once heard of a farmer who boasted that he had cleared \$1,000 from the sale of his products that year, and soon after in conversation with a merchant, declared that there was no money in farming. His boy looked at his patched and thread-worn clothes, then at the merchant's well-fitting suit of new clothes. The merchant said business was never better, when in fact there was a mortgage on everything he owned. Farmers, be honest with yourselves, your wives and your children. Do not let them feel that you are ashamed of your business. There is no more noble calling than that of the husbandman. It is he who feeds the world.

NEW CONDITIONS—NEW METHODS.

BY E. L. FURNESS, FURNESSVILLE.

[Read before the Porter County Farmers' Institute.]

It is worth while now and then to stop and look over the situation and to make a study of the road we travel, to see in what degree we are contented with existing conditions, how nearly they are endurable, and in what way, if any, they are intolerable. From such a survey we may be able to figure out possibilities for improvement and discover what are our apparent duties and decide how best to perform them. The decided changes rapidly taking place in all lines of activities are indeed wonderful, and it is important to know if farmers are measuring up creditably with the rest of mankind and if they are keeping up in the procession. No one fact comes out more positively than that it is the thinking mind that controls, and that education is necessary to develop the thinking mind, and that especially in modern farming, educated intelligence with its improved and skillful methods, has a decided advantage over traditional farming, where the son continues to do very much as his father did and scoffs at the new-fangled notions. The whole industrial world is in an intensely seething caldron of study, how to accomplish purposes in a more direct, better, cheaper manner. Research and the stress of competition are evolving new processes, perfecting old ones, developing higher results, subduing the earth and having such complete dominion over it that it seems to be growing small, and the implements and devices of one year are old fashioned and discarded the next. All the industries—railroads, commerce, manufactures, trades and arts—have ever recurring problems to solve and perplexities to overcome, and in successfully overcoming them, instead of dodging them, grow to be of greater value to themselves and to the world. The farmer is not alone in difficulties; he is learning, whether he wishes to or not, in the school of experience, and is coming out a better scholar. The depression in farming of the past few years has done more to improve methods in farming and to help the farmer than half a century of high prices, and consequently shiftless practices would have done.

The railroads have constantly reduced freight charges, so that a bushel of wheat is taken from Chicago to New York for less than 7 cents; forty years ago the charge was 38 cents. It is a law of necessity for them to do so, one that is more potent for the purpose than State legislation. The lower freight rates are, the more foreign and domestic trade will be, and of course the more freight to move. To cheapen rates of transportation there must be better roadbeds, heavier and smoother rails, lower grades, stronger, lighter and larger cars, larger and heavier trains moved

at less cost. All this and much more is coming in the evolution of the railroad; brain power is equal to the emergency. The great question of the day in which farmers must meet all other workers is how to produce more and better at less cost, and the solution of this question implies better and more thorough methods.

It is a wholesome fact that the methods of farming are steadily improving, that it is becoming more nearly an exact science, and there is good reason for every farmer to believe that if he can do better farming he can make it profitable at even lower prices. That is the farmer's problem to work out alongside of the railroad man and the manufacturer in their equally difficult and like problems of cheapening cost. He can not flinch. Intelligence is so widely diffused that it has become catching, and a man can hardly hide himself away from the epidemic. A farmer can do a great deal voluntarily in adding to his equipment of enlightenment by a good hearty, earnest and honest effort to do so. It is an excellent thing to go from home frequently to study the markets to see what is going on in the world and how it is done, to visit other farmers who are doing something more than ordinary. Every enlightened nation has a corps of educated and observing men at work investigating "farm questions," and many of them are doing good work and making valuable discoveries. The United States and the several States are doing this, and their reports and bulletins can be had by farmers for the asking. The agricultural journals and papers can be had for the cost of the white paper that they are printed on. They discuss and comment on all subjects relating to agriculture, and no farmer who is trying to improve can do without them. Farmers' schools are multiplying and are open to young and old. Successful county farmers' institutes well attended indicate successful farmers in that county; they are a sort of thermometer, showing the temperature of farming in that latitude. Every farm neighborhood should have a farmers' club, meeting at least every two weeks for friendly intercourse, to make life brighter and to consider questions of farm and neighborhood, of township, county, State, nation and the world. The farmer who will take advantage of the helpful aids so abundantly within reach may indeed be a progressive farmer, satisfied with farming, satisfied with himself and his surroundings, content to make more of a man of himself, a better farmer of himself and constantly improving his farm and educating his children to be better than himself. The Garton brothers, of England, are agricultural scientists. They are said to have doubled the yield of five wheat by skillfully crossing it; they have made a six-rowed barley out of a two-rowed variety; crossed English and a Japanese variety of oats until fifty pounds to the bushel is the yield; made red clover perennial, but we need not cross the ocean to find notable things in farming. An American farmer living in this favored land of peace, liberty and security, with its wealth of sunshine and its early and later rain, its refreshing dews, its progress and prosperity and its com-

forts, its thousand and one devices for convenience to lessen the friction of life and make it run smoothly, its many railroads, telegraphs, telephones, graphaphones, its electricity, steam, compressed air, its abundant water power, its rapid and cheap transit, free mails, free schools, free press, cheap books, science and intelligence and advanced civilization and its hungry markets, should not make of himself a hermit and live outside of them or allow himself to be a stranger to what all these great and glorious influences mean. To be an American is greater than to be a king. It is not necessary for the farmer to move into town to enjoy these things, but he should bring them to the farm. The happiest, healthiest and best homes should be farm homes with modern conveniences as a part of them and good roads to and from them over which light hearts of a happy and prosperous people may travel as well as heavy loads of profitable farm products. The well being of a farmer depends largely upon his adapting himself to the great economic changes revolutionizing society, among other things taking advantage of neighborhood and county organization and co-operation. Communities can do what individuals can not. The feasible way to carry out large undertakings for the benefit of community is by a union of forces. A beneficent combination to build up and develop but not to hinder and destroy is desirable, and if electrical cars, horseless carriages and bicycles, lessen the demand for horses, hay and oats, it is not the part of wisdom to fight against them. They are part and parcel of the inevitable, and it is better to accept the inevitable, adopt oneself to it and get out of it what good is possible. It seems to be coming to pass in the evolution of forces that the horse is to be superseded by a mechanical power, and as that will be greatly to the advantage of the farmer he should gladly welcome the day of the passing of the horse, his old-time tried and faithful friend. If farmers will wisely work together it will improve their own condition and not injure others. The labor unions of Indiana object to employing prison labor in the manufacture of goods that will come in competition with what they call honest labor, and they have forced legislation on this subject, and now calmly propose for the State to buy or rent land to have the prisoners set at work raising crops to come into competition with the farmer. The trades unions are organized and aggressive but represent less in number than the farmers, and although the farmers are said to be natural kickers, kicking at straws and shadows, they are expected to grin and bear it at least until it is securely done. The single tax theory is being much discussed. It is proposed to exempt from taxation all valuables of every kind, sort, name and description, excepting land, and to place all the tax upon land alone. Farmers, of course, are interested in this proposition, but an active and organized minority may accomplish its purpose without so much as saying by your leave, and make an actual test of the experiment at the expense and discomfort of the former land owners, who have been legislated out of their possessions. It might be a very useful phase of co-operation

for the taxpayers of the county in convention assembled to establish a sort of vigilance committee to investigate the subject of public finances, to see if all property is equitably assessed and if the money paid in as taxes is economically and properly expended. Farmers can not afford to complain of taxes if they are all right, and if they are not right they should not complain but make them right. There is a right and effectual way of doing things, whether it be to regulate taxes, build war ships, shoot guns to win battles, raise paying crops of corn or to live happily.

The communities which make the greatest progress are those which are the freest to tax themselves for judicious and progressive improvements, and the best way to make taxes seem light is by fostering business that will make money easier to get, for there is that which withholdeth and it tendeth to poverty, and there is that which scattereth abroad and it tendeth to abundance. Taxes in the United States are figured at $2\frac{1}{2}$ per cent. of production, 7 2-10 in Great Britain, $8\frac{1}{2}$ in Germany and $15\frac{1}{2}$ in France and 33 per cent. in Italy. It makes a great deal of difference whether the tax is squandered upon royalty or used for the benefit of the people themselves in schools and roads and public institutions. We hear very much in regard to practical education. It is the kind that enables one to manage affairs in a sensible way, to do the right thing at the right time, to have eyes trained to see, ears trained to hear and hands trained to perform. There is no danger in having too precise an education, so that one can accomplish in the best way whatever he undertakes. If it is to raise a crop of corn he will underdrain the land deeply to control the supply of heat as well as moisture and to develop bacteria. Well drained land will furnish beneficially more water to growing plants than understand land, and water is essential to plant growth, three hundred pounds of it being used in the formation of every pound of dry vegetable matter. The water should not escape from the soil by evaporation but only through the respiration of the plants. When the soil becomes saturated with water plant growth stops, for the air is crowded out of the ground by the redundant water and the ground must breathe to give life to the plants. A cubic foot of soil having one pound of water evaporated from it by the heat of the sun is 10 degrees colder than it was. Ice can be formed by evaporation, and this heat that should make the plant grow has really retarded its growth and it has been worse than wasted in performing a task that the intelligent corn grower might have done for it. Porter County might get rich in growing corn, become one of the richest counties in the State, and there is money in king corn by raising a large yield to the acre, say 80 or 100 bushels, and planting a large acreage so that it should be the leading and special crop, and feeding the entire crop out on the farm in the best way possible. The subject of corn might well occupy the attention of the farmers of this county. It is doubtful if the county raises enough to-day to supply its own demand. There is a surprising amount of corn product imported into Porter

County in the forms of alcohol, whisky, bitters and medicines, of glucose, in beer, sugar, syrup, honey and candies, in starch, hominy, grits, breakfast foods and in the form of pork, hams, shoulders, bacon and sausage, in beef, in butter and in cheese and in condensed milk. It is not good business policy to buy abroad what might be produced at home. Our dairymen are buying outside of the county and paying large sums of money in freight for it, food for their cows that should be raised at home. What is called "the new corn product" has great feeding value, and here the material of which it is made is allowed to go largely to waste. Porter County is an agricultural county, but so far from having any reputation as such it might be wiped from the map and not cause much disturbance to the outside world. A few strawberry buyers might have to look a little further for fruit, a few marsh-hay men perhaps be a little disconcerted, and some milk cans would be filled somewhere else. So far as milk is concerned, although so much of it is shipped away, it is a question if the county could not consume every pint produced in it if it were put in the shape of good cream butter, cheese and veal. Porter County might be a market place where buyers would flock to buy and crops be bargained for before they were planted. The county is now known more widely for its normal college than for any other one thing and that has been built up by energy and push, and the people of this county owe much to the college and to the gentlemen in charge of it. It is to be hoped that they will add an agricultural department to it. I will close by repeating what I have so often said to you before: that Porter County has great advantages for farming. It has a favorable location, with great facilities for shipping to and from every part of it; it has good and near-by markets, fertile soils, good climate, with beneficial, alternations of heat and cold, abundant rainfall and abundant sunshine, an undulating surface, favorable for soil drainage and good health conditions, and, take it all in all, from the sand dunes of Lake Michigan to the Kankakee River, one may search long and diligently, going to and fro in the earth, and up and down in it, to find anything better. The price of land is remarkably low considering its real value and considering, too, the long list of farm products and animals that do well here. All the conditions for prosperity seem to center here in Porter County, ready to respond to an intelligent use of them, regularly and constantly, in abundant crops, that could be made to grow still more bountifully, and profitable farming is entirely possible. The conclusion forces itself upon any one who seriously studies the situation carefully and thoughtfully that with all these favorable conditions in such marked degree, that if the farmers of Porter County are not prosperous, contented and growing wealthy, and with no wish to sell their land, it is from the fact that they do not avail themselves of their opportunities—they fail to rise to the situation. A musical instrument needs a skillful player to bring out its power of music; the sounds it gives forth, good or bad, will depend upon the player. The land in like manner will do well or poorly according to the skill with which it is handled.

SERPENTS IN EDEN.

BY MRS. F. E. SNYDER, WOLCOTTVILLE.

[Read before the Lagrange County Farmers' Institute.]

"All the world was Adam once,
With Eve by his side,"

And through all succeeding ages, whenever and wherever a son of Adam
and a daughter of Eve

"Join hands and hearts,
Till death doth part,"

they begin their earthly paradise. A little sheltered spot, a retreat, a refuge from the world, called in good old Anglo-Saxon, home. As the serpent came into that Eden of old, so he comes into our modern Edens as well; not in one form only, but as a whole brood of serpents, their name is legion for they are many. And as we are to consider some of these serpents to-day, I have not brought a feather duster with me, for nothing so light and airy would answer my purpose.

Neither have I brought a whitewash brush, to make things white on the outside which inwardly are black as night. Nor a kettle of soft soap to rub over people and things in general. For it seems to me the times and condition of affairs demand a club, and I have brought the best club I could find, and I'm after snakes.

Now, don't laugh, for some of them may be your pet snakes, but they are the most dangerous kind. It is the viper, warmed and nourished in your bosom that stings you to the heart!

Of all the forms taken by the old "serpent in chief," he is the most destructive when he comes into the house as the serpent of the still. He is a great big boa constrictor then, and he wraps himself around that home and crushes it to atoms, with all the hearts and hopes and loves that home contains.

Now, you say, "I hope we're not going to get a temperance lecture. We've heard about the miseries caused by drink so often, they're old."

Yes, they are old, old as poverty and crime, old as mothers' broken hearts, and woes, ruined hopes, old as lost manhood and womanhood, old as blighted childhood, old, old, so old that they ought to have been outlawed long ago.

Now, briefly, men and brethren, we want this snake killed. We'd kill it ourselves, but we haven't got the ax! You have. Therefore, as you value your own, and your children's temporal and eternal welfare, and the peace and security of our country, I implore you, brethren, in the name of the Lord, kill this awful snake! Kill it so dead that its tail won't even wiggle till sundown.

And then there is another one, a serpent with a thousand fangs. As deadly an enemy to the home as the serpent of the still. I said he had a thousand fangs, let me name some of them—licentiousness, selfishness, indifference, coldness, hatred, scorn, mockery, deceit. Can you name this serpent? It is divorce! It is a pet snake, too. But, oh, I would I had the club of Hercules with which to dispatch these two snakes. America's disgrace is her divorce laws. Hear what Dr. Talmage says in a recent sermon on this subject:

"Make divorce less easy and you make the human race more cautious about entering upon life time alliance. Let people understand that marriage is not an accommodation train that will let you leave almost anywhere, but a through train, and then they will not step on the train unless they expect to go clear through to the last depot. One brave man this coming winter, rising amid the white marble of yonder capitol hill, could offer a resolution upon the subject of divorce that could keep out of the next century much of the free love and dissoluteness which have cursed this century."

We can judge the future by the past. Looking backward we see a mighty nation—the Roman empire—ruling the world. Her citizens were proud of their birthright. Our old school readers used to tell us, "to be a Roman was greater than a king." But when wealthy and great, then immorality crept in. The marriage vow was lightly esteemed. A Roman lady of high rank voiced the sentiment of her day when she said: "We change our husbands as we do our clothes." A laugh and a sneer for the marriage relation. We now remember the grandeur of the Roman empire only by the greatness of her fall.

Let America beware! History repeats itself. Ships of state as staunch as ours have been wrecked upon the rocks of immorality and vice. "The homes of a nation are its strongest forts." Divorce is the enemy of the home. Honest and law-abiding citizens form the bulwark of our republic. Where are they to come from when the home is gone? Let us have uniformity of divorce laws throughout the union. We are told the law regarding divorce is very lax in Indiana, and we partly believe it. Why, some time ago in a neighboring county a man got a divorce one day and was married the next. And more recently still, the woman in the divorce suit was married immediately after the divorce was granted, the expectant groom having procured a marriage license. The paper adds that the couple went to a justice and were bound in the sacred bonds of matrimony. There is nothing binding and nothing sacred in such a marriage. Now, let those who have the matter in hand, viz., our law-makers, rid our fair State of this disgrace. In all Uncle Sam's vast domain there is no better place to live than in our good old Hoosier State. Here "every prospect pleases and only man and sometimes woman is vile." Therefore, let her no longer be disgraced by these loose divorce laws.

One of the chief causes of divorce is thoughtless marriages. Often

the girl has no thought beyond the new clothes and the wedding trip. Neither of the contracting parties have any thought as to the responsibilities they assume. Now, girls, don't marry in haste. When friends try to advise you don't toss your head and say, "It's nobody's business how I marry." I tell you it's everybody's business how you marry. There is nothing you can do which affects the whole community in which your life is lived, more than how you marry. Not so much whom, but how. Of course, no right-minded girl will think for a moment of marrying a man with any bad habits. Don't, I beg of you, as you value your life's happiness, marry a man to reform him. Don't marry a loafer, don't marry a spendthrift, don't marry a miser, don't, above all things, marry a man for his money. Don't marry a man because he is such a smart young man. The world is going to ruin because of the smartness of some men.

"But," do you say, "whom in the world shall we marry?" Marry an honest man, if you love him with all your heart, and then you'll be married to the "noblest work of God." The crying need of the world to-day is honest men. Marry a man who loves his home as a boy and he will love his own home and not leave you alone evenings while he is down at the grocery sitting on the peace commission. Marry a clean man, a pure man. Demand of him the same high standard of moral purity he demands of you. Marry with the expectation of assuming the duties of wifehood and motherhood with womanly dignity and grace. Marry a man whom you can look to as the head of his home, a manly man.

He need not be a rich man, nor even well-to-do, but if you want a happy home he must be an honest man and he must be a pure man. But where will you find such a man? My dear girl, I don't know. Most likely you will find him on the farm, perhaps in the town. But wait till you do find him or live a life of single blessedness and save yourself a world of misery.

Now then, young man, you be careful whom you marry. The snakes don't all get in on the man's side of the home by any means. Women are not all angels yet, oh no! And when she is inclined that way she can be so much worse than a man knows how to be that, oh my! Therefore, young man, beware! Don't marry a girl just because she has a pretty face. You'll find it hard to smile across the table even at a pretty face when the breakfast is spoiled. Don't marry a girl that don't know how to work and don't want to. Don't marry a girl who spends all her time on the street. Don't marry a girl who spends all the money she can get in extravagant dress. Don't marry the girl who takes all her exercise in riding her bicycle instead of helping her mother. Young man, be careful whom you marry.

Now that the boy and girl are thoroughly instructed, a word to the parents. The children who grow up to have happy homes of their own are not raised on the street. Keep your boys and girls at home. Especially should they be kept off the streets at night. It is a shame to par-

ents that curfew laws are a necessity but, as they are, let us have them by all means.

And this brings us to the consideration of another serpent—one that is becoming more venomous in this day and age of the world than ever before. The Holy Writ says: "In the last days perilous times shall come, men shall be lovers of their own selves, * * * disobedient to parents, without natural affections, * * * lovers of pleasure more than lovers of God." This serpent is anarchy. Anarchy in the cradle, the misery, the home. Anarchy on the street, in the school, in the church, in the State. Anarchy and lawlessness everywhere. In the family as established by the Creator, the husband and father was the head, the wife and mother, the helpmeet, the children obedient, and servants faithful. Look at the average American family of to-day! The hired girl runs the ranch. Then the baby rules all the rest, which isn't so bad. Then the children rule father and mother. The family upside down! "Woe unto thee, oh land, when thy king is a child!" Now, the children are not to blame for this state of affairs. The sweetest thing on earth is a little child. The master himself said: "Of such is the kingdom of heaven."

"They are idols of hearts and of households,
They are angles of God in disguise.
His sunlight still steeps in their tresses,
His glory still gleams in their eyes."

Shall we lose all this beauty and sweetness by allowing the child to become willfully disobedient? Last fall, in Chicago, I heard an evangelist say his father taught him the most useful lesson of his life, and that was the lesson of obedience. His mother would say, "Now go, Jene." "Oh, ma, can't Willie go?" His father said: "Eugene, go." And Eugene went. A child is but poorly equipped for the battle of life who has never learned to obey. The Lord's high encomium upon Abraham was, "I know him, that he will command his children, after him." Young America is very much in evidence nowadays, too much so for his own, or his country's good. Being ourselves subject to the Higher Power, let us teach our children to heed the injunction, "Children, obey your parents in the Lord; for this is right."

Just one more serpent and we are done with them. A very much petted pet snake, this one, and, I venture to say, he is in the pockets of half the men here to-day. The tobacco snake! You know it injures your health, you have heard about the tobacco heart and the tobacco liver, and you all know you have the tobacco breath! Now, there is no chance for an argument here, for you will all admit that it is a bad habit as well as an expensive one, and injures the health of your wives and children as well as your own. It is without doubt the filthiest snake we have yet considered. In its cigarette form it attacks and destroys even little boys. There is not a word to be said in its defense. "Avoid it; pass not by it; turn from it, and pass away."

Now a word about the new woman we hear so much about—the end of the century woman, etc. Who is she? What will she be like? Will she have all the virtues of the old woman and none of her faults? Added to these, will she have many new graces? Will she be more perfectly developed, mentally and physically, and take a broader view of life? In short, will she be more nearly the ideal woman? If so, then all hail to the coming woman! Or, on the other hand, will her time and attention be all taken with outside affairs, and she have no time for husband, home or children? Will she be a byker in bloomers? If so, well, may the child of the future plaintively sing:

"Oh! father, dear father, come home with me now,
For mother's gone off on her wheel;
And since she has purchased her shiney new bike,
We haven't had one decent meal.

"Oh! father, dear father, come home with me now,
The clock in the steeple strikes one;
And mother, I'm sure, won't be home before dark,
For she's making a century run."

Now, understand me, there's no objection to wheels, not the least in the world, but if this should be a true picture of the new woman, give us the old woman every time. Some one has said the old woman could scrub and spank and pray. Now, that is rather an uncouth way of telling a plain truth. She could scrub. That's housekeeping, for the house must be well kept if the home is to be comfortable. Then she could spank. That's discipline; no anarchy where the old woman spansks. And she could pray. That is the godly side of the woman. No woman can be a true wife and mother who does not love and reverence her Creator and teach her children to do so.

Now, then, men and brethren, about these snakes that threaten our homes. You are the lawmakers and we are well enough content that you should be. We are not clamoring for the emancipation of women especially, but brethren, make the right laws. Don't be party blind. Make laws to protect your homes and wives and children. Such laws as Gladstone said will make it hard to do wrong and easy to do right.

But you haven't made such laws. You've made a mess of this law-making business—Oh, such a mess! From an economic point of view you have failed, for those who know say it's harder for a man to make an honest living now than it was fifty years ago. From a moral point of view your laws are largely a failure, for you know that the legalized saloon waits for our boys as soon as they leave our homes. You know that dens of vice are eager for our girls. You know that laws do not protect our homes, our boys, our girls, as they should. These things ought not so to be. It lies within the power of the moral and Christian men of this nation to change this state of affairs, to give to the home the protection it should have. We implore you to do this, for "home is the daughter of heaven." Now that ye know these things, happy are ye if ye do them.

THE FARMER AND SOCIETY.

BY MISS THIRZA B DEEN, PETERSBURG.

[Read before the Pike County Farmers' Institute.]

Society, with all its branches, flowers and fruits, has its roots in the individual man. And the farmer is one of these great social members. Without society there could be no union of labor. Every man would have to do everything for himself and would consequently spend his life in the lowest occupations. Society is supported by work. The satisfaction of human wants is the motive of social activity. Small and Vincent have classified human wants as follows: Health, wealth, sociability, knowledge, esthetics and the wants connected with activity of conscience. The value of any member of society is determined by the extent to which he contributes to the satisfaction of one or more of these wants. There could be no intellectual advancement from age to age without society; nothing inherited from the past and nothing given to the future. Without society there could be no commerce, no public opinions, no religion, no "farmers' institute," no true humanity in man. It is by a union of the social members that the farmer has so many advantages in society, even in rural districts. He now has many advantages, can improve intellectually and can be educated without being a scholar. Almost every farmer may now have access to a daily newspaper if he wishes it. This enables him to know what is going on in the world, and thus he can form opinions as to general topics of the day, as do his city brethren. One of the greatest enemies the farmer has to contend with is his own excessive modesty or distrust in his own powers and ability. And while there are many who fail because of the opposite extreme, there are many more who doubt themselves so much as to wonder, seriously, whether it is ever worth their going forward at all. Now, as a rule, these people are the most worth cultivation. Then, there are many farmers who seem to think they owe nothing to society or to themselves beyond tilling the soil. This is a very much mistaken idea. He owes a great deal to his mind, which elevates him above the brute. He owes a great deal to his body physiologically. "Health," said Simonides, long ago, "is good for mortal man." "Life," said Longfellow, "without health is a burden; with health is a joy and gladness." The body needs rest and the appetites controlled. Temperance not only includes abstaining from intoxicating drinks, but includes sobriety in pleasure, labor, dress and food. Temperance contributes much to sound judgment and staidness of character, which influences the social relation of man. The senses also contribute much to man's social being. Many walk through the world like ghosts, as if they were in the world, but not of it. They have eyes and see not; ears

and hear not. The attentive eye is ever alert to the beauties which surround it, and surely beauty is one of the attributes of good society. The farmer who prides himself in making his home beautiful will draw about him the best society, for man is so constructed as to seek congenial company. One live, energetic, aesthetic farmer in a neighborhood can do much to elevate the surrounding society, for human beings are imitators to some extent. He uses taste in the arrangement of shade trees and flowers, and his house is painted in the latest style; in fact, he is an "up-to-date" man, and is looked upon as a leader, and not a follower, in society. It is a mistaken idea to think because a man earns his bread by the sweat of his face he is not susceptible to the influence which contributes to the highest and most elevated society. He, above all, has the best opportunity in many respects; the long winter evenings may be spent in social gatherings in the community for mutual improvement. Subjects of interest can be discussed which will not only benefit the immediate members, but their influence will be felt in the neighborhood. It is the farmer's own fault that he is, as a general thing, so secluded. Why have not the farmers a musical club in the neighborhood to meet once a fortnight and give one or two public recitals during the winter? Why not have a reading club, in which some good books and magazines can be read and discussed? Let the old men and women take part, as well as younger ones. This thing of getting old as soon as you are married is all nonsense—then is when you want to begin to live. What if the price of pork and butter should be discussed at the musical and reading club, they would only be the better for it. God bless the good, old farmer who knows when to sell his produce to reap the benefits of his labor, and his helpmate who commands a high market price for her golden butter. No one can make his influence any more felt in society than the farmer. Taken as a class, farmers are moral, patriotic and sympathetic. It is the farmer who has time to take his fellow-man by the hand and help him to live a useful and good life; he it is who is able to give the school teacher many valuable suggestions as to the peculiarities of the different products of the soil, thus unfolding many beauties in natural science. We rejoice in the freedom of our land, and we are justly proud that every man, woman and child has a chance to elevate themselves. Did not the farmer do his part in holding the Union together when it was threatened to burst asunder and one section arrayed against another? And who was their leader? Abraham Lincoln, the rail-splitter.

It is frequently said man is the product of two forces, birth and education, or heredity and environment, but there is one force not to be forgotten, and that is his own personality. That work is best for a man which he can best do to elevate society and be of use to his fellow-men.

God has something for each to do which no one else can do as well. It is better to stir the soil and reap a bountiful harvest than to stir

medicine and be a poor physician, or pound the pulpit and make a poor sermon. The good farmer who puts aside business on the Sabbath day and goes to some little country schoolhouse to superintend a small Sabbath school often makes a more lasting impression upon the mind of some young man than the eloquence of Talmage would do, and makes for himself a more lasting monument than that made by hands. What greater reward can he ask than to have young men and women rise up and call him blessed, perhaps after he has gone to his everlasting reward, and say it was he who, by his precept and example, helped them to lead a better life, to be of more use in society? Is it not bread cast upon the water? He who would do the most good must know his own age, his community, his circumstances, the needs of the time and place in which he lives. His services to humanity are not rendered by repeating by rote the services which others have rendered before him, but by ministering to the needs of the present. The man who imagines the world owe him a living has taken the first step toward knavery; the second step is taken when he tries to collect the debt not due him. The greater the success, the greater thief he is if he takes out more than he puts in.

While the man lives we sometimes count him greatest who possesses the most, but when the man dies we count him greatest who has done most good for his fellow-men. Need the farmer think that just because he is a farmer he can let opportunities pass unheeded? Need he think precept is enough? Need he think there is nothing he can do? Need he think if he gives \$50 to a church that is being built on the edge of his farm and pays the minister \$10 a year he has the right to sit by his fire and not bestir himself to help with the work of keeping the right things moving in his society?

If you are old, go and help by your advice; if you are young, go and put your shoulder to the wheel, for, indeed, the field is wide. It is often very hard to keep up Sabbath schools in the country, because heads of families will not attend. Perhaps one or two in the neighborhood go a few Sabbaths—do the best they can—but, in spite of all, a few hoodlums will make the place hideous with their bolsterous ways, and the few give up and say we could do no more without help, while they who stayed at home soliloquize, "I told you so." Then, in a few years, these hoodlums add strength and numbers to their company, and the neighborhood is noted far and near for its roughness. Those very farmers who sat by the fire and prophesied will wonder why it is not as it used to be. Is there anything strange about it? We think not. Let every farmer be as energetic all the time as most of them are during a Presidential campaign, when political rallies are the event of the times. Some do not believe in rallies, but then is the time many a farmer's poor, tired wife gets a new dress for herself and all the children, the family wagon is hitched up, and they all get a grand trip to town and hear the brass band—perhaps the first holiday they have had in four years. Does this not add

something to their monotonous lives? Pleasure is a means, not the end of life—it is the oil which keeps the machinery of life from wearing out. He never has a good time, but he who has a hearty laugh in company, which leaves a sweet remembrance that does his fellow-man good, because we are all better fitted for work by our merriment.

Fame is not the end of life; it is only a shadow cast, and the shadow depends more upon the place the man stands than upon his size. It is a trademark. Many men have the stamp of fame upon them, but without the real quality of success in them. Often there is an invisible handwriting, "Thou are weighed in the balance and found wanting." Many a man who boasts of the Stars and Stripes as his protector is ready to sell his birthright to the highest bidder. Do we find many farmers in this class?

Wealth is not the end of life. It is a power, and life consists, not in the possession of power, but in the right use of it. Often it is not the farmer who can boast of his broad fields and large granaries who does the most for the promotion of his community, but the man who claims only his twenty acres who will be most missed when death reaps his harvest. Then he who achieves most and is a true social member in society, with—

"A heart that can feel for a neighbor's woe,
And share in his joy with a friendly glow,
With sympathies large enough to enfold
All men as brothers is better than gold."

IS THERE ANY DISGRACE IN HONEST LABOR?

BY GEORGE H. SMITH, GUILFORD.

[Read before the Dearborn County Farmers' Institute.]

We see people who consider themselves just a notch or two above the working people, but where they draw the line I do not know. It cannot be between the rich and poor, for we see people who are very wealthy that are incessant workers, while some of their poor neighbors do not work three days in a week on an average. It cannot be because they are more intelligent, for if a man has so cultivated his intellect that he is considered an intelligent man, he has in his search for knowledge become so fixed in his habits of industry and research that you will not find him an idler.

The laboring man is cutting a very prominent figure in the affairs of our nation. We hear of labor days, labor organizations and labor parties. Let us notice a few thoughts from God's Word. He surely had no other purpose in the creation of man than that he should labor. In

Gen. 2-15, we read: "The Lord God took the man and put him in the Garden of Eden to dress it and to keep it." Now, has any person ever secured a patent on keeping a garden without work. Again, in Gen. 3-19: "In the sweat of thy face shalt thou eat bread." Who knows better than the farmer what it means to sweat for his daily bread?

The Psalmist says, "Thou shalt eat the labor of thy hands." Is there a farmer in all this land who does not enjoy eating that which he has labored to bring forth? If there is, he must have the dyspepsia.

Solomon says, "Labor tendeth to life," and "The sleep of a laboring man is sweet," but what says he of the sluggard? "The sluggard will not plow by reason of the cold, therefore he shall beg in harvest and have nothing." Then we have that Fourth Commandment, "Six days shalt thou labor and do all thy work." And then we have in Matt., 11-28, that precious promise, "Come unto me, all ye that labor and are heavy laden, and I will give you rest." That is what we are all looking forward to—the rest that lies at the end of the race.

The trouble with the labor question is that disgraceful men disgrace their calling, and we are in the habit of judging of an occupation by the appearance of those engaged in it. Let us take, for example, the farmer on a hot summer day, when the sun pours down its rays like fury, working in close proximity to the rear end of a threshing machine, while the perspiration freely flows and the dust sticks wherever it touches. Is his appearance an enviable one? Or, again, when he goes out to plow after a shower or to plow corn when the dew is on the ground, his pantaloons are smeared with mud and flop around his heels, and when he goes to dinner he is in hopes his city cousins will not be there to dinner to-day. If we judge farming by such pictures as these, how many of our young men would be willing to engage in farming? Or, if we take for example the wife who is obliged to pail old brindle, who delights to promenade all over a filthy barnyard, which is not over shoetop deep, and when she does corner her she thinks it so nice to set her foot in Bettie's lap or in the bucket, and then occasionally whack her in the face with her fly-brush, then how many of our girls would want to become farmers' wives?

Let us notice some of the prominent men who have figured in our nation's history. I remember during the Lincoln campaign of attending a rally at Lawrenceburg. They brought in a wagon, drawn by oxen, on which was a man splitting rails, representing "Old Abe." Yes, "Old Abe" had been a railsplitter—now, if there is any harder work than splitting rails I don't know what it is—did it disgrace him any?

At the Ohio Centennial, at Cincinnati, was an old threshing machine with this placard attached: "General Grant's old threshing machine." Yes, Grant ran a threshing machine; he ran the Johnnies all out of Dixie, too, and then he stood at the head of our nation for eight years.

We have in our home a picture representing seven scenes in the life

of Garfield. (1) The log cabin where he was born; (2) driving the horses on the towpath; (3) ringing the bell at Hiram College, where he did janitor work to help pay his way through college; (4) plowing; (5) in the field, with his boys, mowing, when he received the news of his election to Congress; (6) his beautiful home at Mentor; (7) his monument, at Lakeview. Garfield was a laboring man—yet he is remembered as our martyred President.

How about Hobson after he had gained world-wide fame and won the respect of even his enemies by his gallant act of heroism? Did he sit down to enjoy the plaudits of an admiring nation? By no means, but went to work to help save the treasures he had helped to capture. And so we find it is not necessary for a laboring man to join Coxey's Army in order to get to Washington.

Who shall judge man from his manners,
Who shall know him by his dress;
Paupers may be fit for princes,
Princes fit for something less.

Crumpled shirt and dirty jacket,
May beclothe the golden ore
Of the richest thought and feeling;
Satin vest can do no more.

There are streams of crystal nectar
Ever flowing out of stone,
There are purple beds and golden
Hidden crushed and overgrown.

God who counts by souls, not stations,
Loves and prospers you and me,
While He values thrones the highest,
But as pebbles in the sea.

THE BEST MACHINERY FOR THE AVERAGE FARMER.

BY H. H. ZIKE, SULLIVAN.

[Read before the Sullivan County Farmers' Institute.]

The subject assigned me is one of more importance than is generally accorded it. The best machinery is none too good for any farmer. In this era of competition and low prices it is to the farmer's interest to own machinery that will do the best and fastest work, thereby cheapening the cost of production. The difference of a few dollars in the first cost of a machine or implement should not cause the farmer to hesitate if thereby he can save time or increase his crops.

There are a great many cheap and almost worthless tools advertised for sale, and if the farmer is not on his guard he is liable to be the loser.

The line of farming that one is following should govern the kind of implements. The specialist will require entirely different tools from the average farmer. The average farmer, as I understand it, is one that runs two or three teams and follows a line of mixed farming, raising stock, corn, wheat, hay, oats, etc., to sell, and only vegetables and fruit for his family.

It is not necessary to have a large number of each kind of implements, as the teams can be put to different kinds of work, for instance, in running three teams, two can plow while the other one prepares the ground for seeding, thereby saving the purchase of one breaking plow.

While the disc harrows and cultivators are being used more each year and are good tools, yet for all purposes, I think, the turning plow and shovel cultivator, accompanied by the use of springtooth and smoothing harrows, are the best. As the plow turns all the ground when properly adjusted, and the harrows mentioned stir all the ground thoroughly.

With improved machinery it is practicable for the farmer to do his work better and very much speedier, thereby enlarging his farming without decreasing his productions per acre. To purchase all tools and implements required by the average farmer at one time would require considerable capital, but one can add to his list as he can afford to, and by taking the proper care of his tools can in a few years possess all the tools necessary to farm successfully.

The care of tools is one of the greatest leaks on the average farm. It is a very easy matter to prepare some kind of shelter for the tools; even a straw shed, if well put up, will form a good protection for costly machinery. I know of farmers who purchase lots of good machinery, but owing to careless use hardly ever have a tool in good repair.

Every farmer should possess a supply of small tools, such as saw, hatchet, brace and bits, chisels, square, punches, etc., and by a little practice can soon learn to make many improvements and repairs that will add to his convenience and income.

I will append a list of machinery that I think necessary for the average farmer. At least, I use such machinery:

Two walking, breaking plows, with jointers; 1 sulky plow, for hard breaking, not for riding alone; 1 smoothing harrow, 2 one-horse springtooth cultivators, or harrows; 1 Hallock weeder, 1 slab roller, 2 walking cultivators, 1 two-horse corn drill, 1 wheat drill, 1 self-binder, 1 mower, 1 clover-seed harvester (I am a clover crank and raise seed), 1 hay tedder, 1 two-horse rake, 1 one-horse rake, 2 wagons and hay ladders.

For new ground I am compelled to use smaller tools, such as an A harrow, bar plows, double shovels and one-horse drill.

There are but few farms in our county but what, with a little time spent in taking out stumps and filling washes, that labor-saving tools could not be used on to advantage, but with all the machinery necessary to farm successfully, if not used properly they will be of but little use.

I have seen farmers turning over big clods with their cultivators when they should be using the roller and harrow.

I believe the smoothing harrow to be one of the most profitable tools on the farm if used properly.

But while we are planning to save labor in our fields, we should not forget to see what the wife needs to lighten her labors. It is not necessary to enumerate the various articles she will need in her daily works, as she can tell you better than I.

THE BEST LEGACY A MAN CAN LEAVE HIS CHILDREN.

BY J. B. WEIR, HARTFORD CITY.

[Read before the Blackford County Farmers' Institute.]

This topic was selected for me by the committee who kindly placed me upon the program, I think, just through curiosity to learn what one of as limited experience as I have had might say upon so great a subject as this. We all appear to be greatly interested in learning how best to rear all kinds of stock upon our farms and how best to prepare it so as to bring us the greatest and most profit, and also how best to raise all kinds of grain, fruits and vegetables, and prepare the same for the market, so as to bring to the producer the greatest profit for his labor. But how many of us, think you, who are rearing up our boys and girls, have given one moment of thought or study to the great question—"How best to rear up and prepare our children to receive and make the best and most profitable use of the inheritance we may leave to them." By the side of this question all other questions which have been discussed before dwarf into insignificance. A strong, well-educated mind, supported by a strong, healthy body, is a fortune to either man or woman. It is said in Holy Writ that, "God created man in his own image and placed him in the Garden of Eden," and that man, through transgression, fell, and from the fall of man in the Garden of Eden God's decree went forth. "Cursed is the ground for thy sake; in sorrow shalt thou eat of it all the days of thy life," has been and will be in full force and effect as long as man is permitted by the Almighty Creator to exist upon this earth. That decree will stand, because God further said: "Thorns also and thistles shall it bring forth to thee; and thou shalt eat the herb of the field. In the sweat of thy face shalt thou eat bread, 'till thou return unto the ground; for out of it was't thou taken; for dust thou art and unto dust shalt thou return." Therefore, God sent man from the Garden of Eden to till the ground from whence he was taken. Hence we come at once to the conclusion that this life is a life of toil and sacrifice, that it is necessary

that man should labor. It is worth our while to give this matter earnest thought, although we have only time to make a few assertions, glance at them and leave you to think of them. Every honest and industrious parent who wishes to earn fairly every dollar he spends, and who does this for the benefit of those he loves, and who denies himself to get a home and a margin in case of disaster, and does this cheerfully, is a successful parent. To us things do not seem to come out right. We cannot see the hand leading, guiding, arranging and weaving the confused, tangled threads of human life into the grand, clear and noble pattern of divine purpose. And because we cannot see the end from the beginning we seem to be justified in complaining. To the thoughtful parent no question is equal in magnitude to the question of the welfare of his children, beside which problems of national and international disputes, though engaging the attention and calling forth the best efforts of the brightest and noblest mind in the land, pale into insignificance. The duty of parents to their children transcends even the love of country and all other obligations to society or to mankind. If a man owes a debt of such magnitude and he does not know how best to liquidate, it becomes a matter of great concern for him. How to make the most of a brief life on this grand old plant has ever been a theme for the statesman, philosopher and poet. Society is simply an aggregation of individuals, and can be no better than they. On certain great occasions we are wont to boast of the priceless heritage bequeathed to us by the illustrious founders of the Republic. Some people consider this queer in an age of shams and mammon worshiping, when the motto seems to be, "Satan take the laggard." It is clear from our point of view that the boys and girls of to-day, and of the future, should go forth to play their respective parts in the great drama of life with trained minds, light hearts and buoyant hopes, the legitimate and essential elements of contentment and happiness in every home and clime. In short, the best gift of a parent to his children, that will abide and bless, is a strong, vigorous physical organization and a mind fitted to detect the true from the false (a difficult matter in these stirring times, since they look as much alike as twins), and to have them imbued with those principles of justice and honor that more than aught else distinguish the civilized from the savage. These, with the memory of a pleasant home, in which peace and harmony dwelt and over which love spread her sheltering wing, are of greater value to the individual and to the race of mankind than stocks and bonds, houses and lands. In the language of Lowell:

"The rich man's son inherits lands,
And piles of brick and stone, and gold,
And he inherits soft white hands
And tender flesh that fears the cold.
A heritage, it seems to me,
One scarce would wish to hold in fee.

The rich man's son inherits cares:
 The bank may break, the factory burn,
 A breath may burst his bubble shares,
 And soft white hands could hardly earn
 A living that would serve his turn.
 A heritage, it seems to me,
 One scarce would wish to hold in fee.

What doth the poor man's son inherit?
 Stout muscles and a sinewy heart,
 A hardy frame, a hardier spirit:
 King of two hands, he does his part
 In every useful toil and art;
 A heritage, it seems to me,
 A king might wish to hold in fee.

What doth the poor man's son inherit?
 Wishes o'erjoyed with humble things,
 A rank with toil-worn merit,
 Content that from employment springs
 A heart that in his labor sings;
 A heritage, it seems to me,
 A king might wish to hold in fee.

What doth the poor man's son inherit?
 A patience learned by being poor,
 Courage, if sorrow comes, to bear it,
 A fellow-feeling that is sure
 To make the outcast bless his door;
 A heritage, it seems to me,
 A king might wish to hold in fee,

O, rich man's son! There is a toil
 That with all others level stands;
 Large charity doth never soil,
 But only whitens soft, white hands.
 This is the best crop from thy lands;
 A heritage, it seems to me,
 Worth being rich to hold in fee.

A poor man's son! Scorn not thy state,
 There is worse weariness than thine
 In merely being rich and great:
 Toil only gives the soul to shine
 And makes rest fragrant and benign,
 A heritage, it seems to me,
 Worth being poor to hold in fee.

Both heirs to some six feet of sod,
 Are equal in the earth at last;
 Both children of the same dear God,
 Prove title to your heirship vast
 By record of a well-filled past;
 A heritage, it seems to me,
 Well worth a life to hold in fee."

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